THE

# EDINBURGH NEW DISPENSATORY:

CONTAINING

I. THE ELEMENTS OF PHARMACEUTICAL CHEMISTRY.

II. THE MATERIA MEDICA; OR THE NATURAL, PHARMACEUTICAL AND MEDICAL HISTORY, OF THE SUBSTANCES EMPLOYED IN MEDICINE.

III. THE PHARMACEUTICAL PREPARATIONS AND COMPOSITIONS.

INCLUDING

TRANSLATIONS OF THE EDINBURGH PHARMACOPŒIA PUBLISHED IN 1817, OF THE DUBLIN PHARMACOPŒIA IN 1807, AND OF THE LONDON PHARMACOPŒIA IN 1815.

*Illustrated and explained in the Language, and according to the Principles, of* MODERN CHEMISTRY.

WITH NUMEROUS TABLES.


## BY ANDREW DUNCAN JUN. M. D.

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TO

# ANDREW DUNCAN, M. D.

PROFESSOR OF THE INSTITUTIONS OF MEDICINE

IN THE

*UNIVERSITY OF EDINBURGH,*

THIS WORK

IS MOST DUTIFULLY AND AFFECTIONATELY

INSCRIBED

BY

HIS SON.

# PREFACE.

Dr Lewis published the first edition of his *New Dispensatory* in 1754. The principal part of that work was a commentary upon the London and Edinburgh Pharmacopœias, of both of which it contained a complete and accurate translation. A concise system of the Theory and Practice of Pharmacy was prefixed as an introduction; and directions for extemporaneous prescription, with many elegant examples, and a collection of efficacious, but cheap remedies, for the use of the poor, were added as an appendix.

The manner in which the whole was executed, placed Dr Lewis at the head of the reformers of Chemical Pharmacy; for he contributed more than any of his predecessors to improve that science, both by the judicious criticism with which he combated the erroneous opinions then prevalent, and by the actual and important additions he made to that branch of our knowledge. He was justly rewarded by the decided approbation of the public. During his lifetime many editions were published, each succeeding one receiving the improvements which the

advancement of the sciences connected with Pharmacy suggested.

After the death of Dr LEWIS, Dr WEBSTER, and Dr DUNCAN *senior* successively contributed to maintain the reputation of the work, by taking advantage of the discoveries made in natural history and chemistry, and by making those alterations which new editions of the Pharmacopœias, on which it was founded, rendered necessary. From the place of their publication, and to distinguish them from the original work of Dr LEWIS, which was still reprinted in London without alteration, these improved editions were entitled *The* EDINBURGH *New Dispensatory*.

When the Edinburgh College were preparing to publish a new edition of their Pharmacopœia in 1800, the booksellers who purchased the copy-right of that work were desirous that it should be accompanied by a corresponding Dispensatory. Indeed, since the year 1788, when my Father revised it, it had undergone no material alteration, although it has been often reprinted with the name of another editor. During that period, the progress of chemistry, pharmacy, and natural history, has been so great as to render a complete reform absolutely necessary.

This, to the best of my abilities, I attempted in the first edition, which I published in 1803, and, if I may judge from the sale of the work, not altogether unsuccessfully. For, although the impression was very large, in the course of fourteen years it has gone

through eight editions, and is now published for the ninth time. These frequent editions have enabled me, on the one hand, to prevent the work from ever falling very materially behind the state of the science; but, on the other hand, the very short time allowed me to prepare each for the press, compared with the size of the volume, the multiplicity of objects which it embraces, and the very rapid progress and unsettled state of chemistry, have hitherto prevented me from giving it that degree of perfection which I have always wished it to possess. On most occasions I have had recourse to original sources of information; and when I have sometimes borrowed from other compilers like myself, I have always taken care to be assured of their accuracy. I may also, as a proof of my anxiety to render this work worthy of the favourable reception with which it has met, advert to the numerous experiments which I have made, either to settle points upon which the best authorities were at variance, or to investigate substances which were imperfectly understood.

The additions, improvements and corrections in the present edition are considerable. To notice all of them, from the manner in which they are dispersed throughout every part of the work, would far exceed the limits of a preface. The most important have originated in the alterations and corrections introduced by the Edinburgh College into the new edition of their Pharmacopœia, of which the present

Dispensatory contains an accurate translation, and to which the commentaries have been adapted.

In all the editions the plan and arrangement adopted by Dr LEWIS have been followed. The work is divided into three parts. The first contains Elements of Pharmacy; the second the Materia Medica; and the last, the Preparations and Compositions.

The *first* of these is entirely new, nothing being retained but the title. It is divided into two sections. The first contains a very concise account of some of the general doctrines of *Chemistry*, and of the properties of all simple bodies, and the generic characters of compound bodies. In the second part, the *Operations of Pharmacy*, and the necessary apparatus, are described; and an Appendix is added, containing many very useful tables.

The *second* and *third parts* contain translations of the Pharmacopœias of the Colleges of Edinburgh, Dublin, and London; with a commentary, more or less full, as the nature of the article seemed to require. In the dictionary of *Materia Medica*, I have adopted the nomenclature of the Edinburgh College, or rather of natural history, in preference to the officinal names hitherto employed. To the systematic name of each article are subjoined its synonimes in the different Pharmacopœias, and the designations of the parts used in medicine; then the class and order of natural bodies to which it belongs; and if a vegetable, the exact number of its genus and spe-

cies, according to the excellent edition of LINNÆUS's *Species Plantarum*, published at Berlin by Professor WILLDENOW.

In consequence of the plan which I adopted, of confining this Dispensatory to the articles contained in the British Pharmacopœias, I was obliged to omit several substances in use as popular remedies, as well as those which are now obsolete, but frequently occurring in old medical authors, and such as have acquired reputation in other countries, or are even fashionable at home, but not yet sanctioned by any of our Colleges. The necessary information respecting these, along with short Elements of Therapeutics, and the Principles of Extemporaneous Prescription, illustrated by examples, I intend to publish separately, as an Appendix to the Edinburgh New Dispensatory.

# CONTENTS.

## PART I.

### ELEMENTS OF PHARMACY.



## SECTION I.

### EPITOME OF CHEMISTRY.

## SECTION II.

### PHARMACEUTICAL OPERATIONS,

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## APPENDIX.

# PART II.

## MATERIA MEDICA.



# APPENDIX.

# PART III.

## PREPARATIONS AND COMPOSITIONS.

THE

# EDINBURGH

# NEW DISPENSATORY.

## PART I.

## ELEMENTS OF PHARMACY.

1. THE object of Pharmacy is to provide those substances which may be employed for the prevention or cure of disease.

2. To obtain this object completely, an acquaintance with the physical and chemical properties of these bodies is necessary. This may be termed the *Science of Pharmacy.*

3. Few substances are found in nature in a state fit for their exhibition in medicine. The various preparations which they previously undergo constitute the *Art of Pharmacy.*

4. Pharmacy is so intimately connected with Chemistry, that the former can neither be understood as a science, nor practised with advantage as an art, without a constant reference to the principles of the latter. For this reason, it is proper to premise such a view of the general doctrines of chemistry, and of the most remarkable properties of chemical agents, as is necessary for the purposes of pharmacy.

## SECT. I.

### EPITOME OF CHEMISTRY.

5. The most minute particles into which any substance can be divided, similar to each other, and to the substance of which they are parts, are termed its *Integrant particles.*

6. The most minute particles into which bodies can ultimately be divided are called their *Elementary particles.*

7. When the integrant particles admit of no further division, the body is a *Simple Substance.*

8. But the integrant particles of most bodies can be subdivided into other particles, differing in their nature from each other, and from the body of which they are parts. These are *Compound Bodies.*

9. If the particles, of which the integrant particles of any compound body are composed,

*a.* admit of no further division, the body is a *Primary Compound;*

*b.* but if they be also compound, and admit of still further subdivision, they are called *Intermediate particles*, and the body is a *Secondary Compound.*

10. Therefore the integrant particles

*a.* of simple substances are also their elementary particles;

*b.* of primary compounds are composed of elementary particles;

*c.* of secondary compounds are composed of intermediate particles.

11. The phenomena of matter are regulated by attraction and repulsion.

### ATTRACTION.

12. *Attraction* comprehends those forces which cause bodies to approach towards each other.

13. It operates

*a.* at sensible distances, as in the attractions of *gravity, electricity* and *magnetism;*

*b.* at insensible distances; *Contiguous Attraction.*

*a. a.* between particles of the *same* species, constituting the attraction of *cohesion* or *aggregation;*

*b. b.* between particles of *different* species, the attraction of *composition* or *affinity.*

### REPULSION.

14. *Repulsion* tends to separate bodies from each other.

15. It also operates either

*a.* at sensible distances, as in the repulsion of *electricity* and *magnetism;* or,

*b.* at insensible distances, as in the repulsion of the matter of heat or *caloric.*

16. The phenomena resulting from the operation of attractions, and repulsions at insensible distances, constitute the proper objects of chemistry.

GRAVITY.

17. The most general species of attraction is that by which masses of bodies tend to approach each other.

Light, heat, electricity and magnetism alone, seem to be exempted from its influence. Hence those substances have been called, though not correctly, *Imponderable.*

*a.* Gravity acts in the direct ratio of the quantity of matter, and in the inverse ratio of the square of the distance.

*b.* It is indestructible and uniform.

*c.* It has no antagonist repulsion.

*d.* In free space it acts equally on all kinds of matter.

*e.* In gravitating media, it is different with respect to different kinds of matter; and the relative weights of equal masses of bodies constitute their *Specific Gravity;* water being commonly assumed as unity for solids and fluids, and hydrogen gas sometimes for airs and vapours.

*f.* The proportions in which bodies unite, seem to be multiples of the specific gravity of their elementary particles.

AGGREGATION.

18. Gravitating bodies exist under different forms of aggregation:

*a.* Solid, in which the attraction of cohesion resists relative motion among the particles, more or less perfectly, and the fragments are angular, and do not reunite on being placed in contact.

*b.* Fluid, in which it admits of relative motion among the particles, with greater or less facility, and small portions have a tendency to assume a globular form, and readily reunite on coming into contact.

*c.* Gaseous, in which the particles repel each other.

AFFINITY.

19. Affinity is regulated by the following laws:

*a.* It does not act at sensible distances.

*b.* It is exerted only between particles of different species.

*c.* It is exerted by different bodies, with different degrees of force; and hence it was called *Elective Attraction.*

*d.* It unites bodies in definite proportions; and when bodies combine in more proportions than one, these are multiples of each other. Also when more than two bodies unite, they exist in the same proportions, or multiples of the same proportions in which they form binary compounds. Lastly, when oxygenized bodies are combined, each of them contains the same quantity of oxygen, or multiples of the same quantity; and oxygenizable bodies combine in such proportions as will require equal or multiple quantities of oxygen for their oxygenizement.

*e.* It unites a first proportion of one body with another, more strongly than a second; a second than a third, and so on; and hence it is in the inverse ratio of saturation, and seems to increase with the mass.

*f.* It is influenced by cohesion, specific gravity, elasticity and temperature.

*g.* It is often accompanied by a change of temperature.

*h.* Substances, chemically combined, acquire new properties;

*i.* and cannot be separated by mechanical means.

*k.* The action produced by different affinities, existing in one substance, is called *Resulting Affinity.*

20. Affinity is

*a. simple*, when two bodies unite, in consequence of their mutual attraction, whether these bodies be themselves simple or compound, and even although, in the latter case, it be attended with decomposition.

*b. compound*, when there is more than one new combination, and when the new arrangement would not have taken place, in consequence of the attractions tending to produce either combination singly.

21. The attractions which tend to preserve the original arrangement of bodies presented to each other are denominated *Quiescent Attractions*; those which tend to destroy the original, and to form a new arrangement, are termed *Divellent attractions.*

It is evident that no new arrangement can take place, unless the divellent be more powerful than the quiescent attractions.

## CLASSIFICATION OF SIMPLE SUBSTANCES, ACCORDING TO DR THOMSON.

22. Imponderable bodies.

Light.
Heat.
Electricity.

Ponderable bodies.

Simple supporters of combustion:

Oxygen.
Chlorine.
Iodine.
Fluorine.

Simple incombustibles.

Azote.

Acidifiable combustibles.

Hydrogen.
Carbon.
Boron.
Silicon.
Phosphorus.
Sulphur.
Arsenic.
Tellurium.
Osmium.

Intermediate combustibles.

Antimony.
Chromium.
Molybdenum.
Tungsten.
Columbium.
Titanium.

Alkalifiable combustibles.

Potassium.
Sodium.
Calcium.
Barium.
Strontium.
Magnesium.

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Yttrium.
Glucinum.
Aluminum.
Zirconium.
Thorinum.

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Iron.
Nickel.
Cobalt.
Manganese.
Cerium.
Uranium.

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Zinc.
Lead.
Tin.
Copper.
Bismuth.
Mercury.
Silver.

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Gold.
Platinum.
Palladium.
Rhodium.
Iridium.

## COMPOUND BODIES.

23. Compound bodies may be divided into

*a*. *Primary compounds* (9. *a*), consisting of simple substances combined with each other. These may be sub-

divided into binary, ternary, quaternary, &c. according to the number of their constituents.

*b. Secondary compounds*, (9. *b*), consisting of compound bodies combined with simple bodies, or with each other.

This division is convenient, but arbitrary, as we are in fact ignorant of what are really simple bodies, and cannot ascertain the manner of combination in bodies compounded of three or more elements.

### LIGHT.

24. Light emanates in every direction from visible bodies.

25. It moves in straight lines, with a velocity equal to 164,000 miles in a second.

26. Its gravity is not appretiable.

27. When a ray of light passes very near a solid body, it is *inflected* towards it.

28. When it passes at a distance somewhat greater, it is *deflected* from it.

29. When a ray of light falls upon a polished surface, it is *reflected* from it, and the angle of reflection is equal to the angle of incidence.

30. Some bodies have the property of polarizing and others of depolarizing light.

31. Bodies which do not allow light to pass through them are termed *Opaque*.

32. Those which allow it to pass freely through them are termed *Transparent*.

33. When a ray of light passes obliquely from one medium into another of greater density, it is bent towards the perpendicular; but if the second medium be of less density, it is bent from the perpendicular. The light, in both cases, is said to be *Refracted*.

34. The refracting power of bodies is proportional to their densities, except with regard to inflammable bodies, of which the refracting power is greater than in proportion to their densities.

35. By means of a triangular prism, light is separated by refraction into seven coloured rays; red, orange, yellow, green, blue, indigo, and violet.

36. These rays are permanent, and suffer no further change by reflection or refraction.

37. They differ in flexibility and refrangibility; the red possessing these properties in a less degree than the orange, the

orange than the yellow, and so on in the order of their enumeration.

38. The *illuminating power* of the different rays is greatest between the yellow and green, and gradually declines towards both ends of the spectrum.

39. The different colours of bodies depend on their transmitting or reflecting those rays only which constitute their particular colours.

40. White consists of the whole prismatic rays united.

41. Black is the total absence of light, or complete suffocation of all the rays.

42. The sun's rays possess the power of heating bodies.

43. The *heating power* of the different rays is inversely as their refrangibility. But as this power is greatest at some distance beyond the red end of the visible spectrum, it is probable that it is totally independent of the calorific rays.

44. Bodies are heated by light inversely as their transparency, and directly as the number of rays suffocated by them.

45. The sun's rays possess the chemical property of separating oxygen from many of its combinations.

46. The *disoxygenizing power* of the different rays is in proportion to their refrangibility. But as this power is greatest at a small distance beyond the violet end of the visible spectrum, it is probable that it is totally independent of the colorific or calorific rays.

47. Light is absorbed by many bodies, and again emitted by them in the dark.

48. The sources of light are the sun's rays, phosphori, combustion, combination, heat, and percussion.

49. Light is supposed by some to exist in a latent state in all combustible bodies.

## CALORIC.

50. Heat, in common language, is a term employed to express both a certain sensation, and the cause producing that sensation. In philosophical language, it is now confined to the sensation, and the term *Caloric* has been adopted to express the cause.

51. The particles of caloric repel each other: it is therefore disposed to fly off in every direction from a body in which it is accumulated, or to pass off by radiation.

52. Caloric is attracted by all other bodies. It has therefore an irresistible tendency so to distribute itself as to produce an universal equilibrium of temperature, or to pass from bodies in which it is accumulated, into bodies in which it is

deficient, until the attraction of each for caloric, and the repulsive force of the caloric contained in each become equal to each other.

53. Caloric is radiated most slowly by polished metallic surfaces, and most quickly by rough blackened surfaces.

54. Radiated caloric is admitted most readily by rough blackened surfaces, and most difficultly by polished metallic surfaces.

55. Radiated caloric is transmitted with the velocity of light; and is, in like manner, reflected and refracted.

56. But the passage of caloric through most bodies is immensely slower than radiated caloric.

57. When caloric moves through bodies with this diminished velocity, it is said to be conducted by them. Metals are the best conductors; then stones, glass, dried wood. Spongy bodies, in general, are bad conductors. Fluids also conduct caloric; but as they admit of intestine motion among their particles, they carry it more frequently than they conduct it.

58. *Temperature* is that state of any body, by which it excites the sensation of heat or of cold, and produces the other effects which depend on the excess or deficiency of caloric.

59. The most general effect of caloric is *expansion*; the only real exception to this law being the contraction of water, from the lowest temperature at which it can remain fluid, to 42° 5′ F. This expansion either consists,

*a.* in a simple increase of volume; or

*b.* it produces a change of form in the substance heated.

*a. a.* from solid to fluid; *fusion, liquefaction.*

*b. b.* from solid or fluid to vapour; *vaporization.*

60. Bodies expand gradually, and at all temperatures, so long as they undergo no other change.

61. Bodies differ very much in the degree of gradual expansion, (59. *a*) which equal increments of temperature produce in them. Gases are more expansible than fluids, fluids than solids. The individuals of the latter forms of aggregation also exhibit considerable differences.

62. The change of form (59. *b*) occurs suddenly, and always at certain degrees of temperature.

63. *Vaporization* is much retarded by increase of pressure, and facilitated by its diminution, insomuch, that those substances which, under the ordinary pressure of the atmosphere, seem to pass at once from the state of solid to that of vapour, may, by the application of sufficient pressure, be made to assume the intermediate state of fluidity; while, on the contrary, all fluids which have been hitherto tried, begin in a vacuum

to boil and to emit vapour, when their temperature is lower, by 120° at least, than their vaporific point, at the ordinary pressure of the atmosphere.

64. From analogy, all bodies are considered as solid when totally deprived of caloric; but they are termed solid, fluid, or gaseous, according to the state in which they exist at the ordinary temperature of the atmosphere. They are also termed fusible or infusible, volatile or fixed, condensible or permanently elastic, according to the effects of caloric upon them.

65. Another very general effect of caloric is *increased temperature.*

*a.* This effect is constant when bodies retain their form of aggregation, or undergo the gradual species of expansion (59. *a*);

*b.* but while they undergo the sudden species, (59. *b.*) they remain at one determinate temperature, that necessary for their fusion or vaporization, until the change be completed throughout the whole mass.

66. During the time necessary to effect this, the influx of caloric continues as before; and as it does not increase the temperature, it is said to become latent or combined.

67. The caloric necessary for these changes (65. *b.*) is best denominated the caloric of fluidity, and the caloric of vaporization; and its quantity is determinate with regard to each substance.

68. The absolute caloric, or total quantity of caloric contained in any body, is perfectly unknown; but the quantity which increases the temperature of any body a certain number of degrees, is termed its specific caloric, (Capacity for caloric, of Black, Crawford, and others,) when its weight is the object of comparison; and by Dr Thomson, its capacity for caloric, when its volume is considered. The specific, and therefore the absolute caloric of bodies, varies very much.

69. *Incandescence* is the least general effect of caloric, as it is confined to those substances which are capable of supporting the very high temperature necessary for its production, without being converted into vapour or gas.

70. On the living body caloric produces the sensation of heat, and its general action is stimulant. Vegetation and animal life are intimately connected with temperature, each climate supporting animals and vegetables peculiar to itself.

71. Caloric influences affinity, both on account of the operation of its own affinities, and of its facilitating the action of bodies, by counteracting cohesion. For the latter reason, it also promotes solution, and increases the power of solvents.

72. The general effects of the abstraction of caloric, are *di-*

*minution of volume*, *condensation*, *diminution of temperature*, and *sensation of cold*. It also influences affinity, and, in general, retards solution. The abstraction of caloric never can be total; and the attempts to calculate the thermometrical point at which it would take place, although ingenious, are not satisfactory. Those most worthy of attention place it about —1500° F.

73. The means employed to increase temperature are, the rays of the sun, collected by means of a concave mirror, or double convex lens, electricity, friction, percussion, collision, condensation, and combustion. Temperature is diminished by rarefaction, evaporation, and liquefaction.

74. Temperature is estimated relatively by our sensations, and absolutely by means of various instruments. The thermometer indicates temperature by the expansion which a certain bulk of fluid undergoes from the addition of caloric, and by the condensation produced by its abstraction. Mercury, from the uniformity of its expansion, forms the most accurate thermometer; but for temperatures in which mercury would freeze, alcohol must be employed. Air is sometimes used to shew very small variations of temperature. The action of the pyrometer of Wedgwood, which is employed for measuring very high temperatures, depends upon the permanent and uniform contraction of pure clay at these temperatures.

### ELECTRICITY.

75. The particles of the electric fluid repel each other, with a force decreasing as the distances increase.

76. They attract the particles of other bodies, with a force decreasing as the distances increase; and this attraction is mutual.

77. They are dispersed in the pores of other bodies, and move with various degrees of facility through different kinds of matter.

*a*. Bodies, through which they move without any perceivable obstruction, are called *Non-electrics*, or *Conductors*. Of these the chief are the metals, charcoal, and inflammable metallic compounds.

*b*. Bodies, through which they move with very great difficulty, are called *Electrics*, or *Non-conductors*. Of these the chief are glass, sulphur, oils, resins and compounds of the metals with oxygen or chlorine, (oxymuriatic acid).

*c*. Bodies through which they move, but with difficulty,

are called *Imperfect Conductors.* Of these we have examples in alcohol and ether.

78. The phenomena of electricity arise

*a.* from the actual motion of the fluid from a body containing more, into another body containing less of it;

*b.* from its attraction or repulsion, independently of any transference of fluid.

79. By rubbing electrics on each other, the distribution of the electric fluid in them is altered. On separating them, the one contains more, and the other less than the natural quantity; or, the one becomes positively, and the other negatively electrified. Positive electricity is also called *vitreous,* and negative also *resinous.*

80. Electrics may also be excited by rubbing them with non-electrics.

81. If a body B be brought into the neighbourhood of an electrified body A, B becomes electrified by position.

82. If an insulated body B, that is, a body in contact with electrics only, be brought into the neighbourhood of an electrified body A, B becomes permanently electrified, and the electricity of A is diminished, while a spark passes between them accompanied by sound. If a metallic point be presented to a body negatively electrified, it emits rays of light; if to a body positively electrified, it becomes simply luminous.

83. When a body A has imparted electricity to another body B, they repel each other, unless B shall have afterwards imparted all its electricity to other bodies.

84. Bodies repel each other, when both are positively or both negatively electrified.

85. Bodies attract each other, when the one is positively and the other negatively electrified.

86. If either of the bodies be in the natural state, they will neither attract nor repel each other.

87. The electric spark is accompanied by intense increase of temperature, and will kindle inflammable bodies.

88. Electricity is disengaged during many chemical actions, and it produces very remarkable chemical effects, depending chiefly on sudden and momentary increase of temperature, and on the light produced.

89. Electricity acts on the living system as a stimulus.

## GALVANISM.

90. The phenomena of galvanism seem to depend solely on

the agency of electricity, excited during certain chemical actions.

91. It is excited by arranging at least three heterogeneous bodies, two conductors and one imperfect conductor, or two imperfect conductors and one conductor, in such a manner, that they form a connected arc or chain, in which each is interposed between the other two.

92. The pile of Volta, by which it is rendered most manifest, is constructed, by combining a series of simple galvanic arcs into one continuous circle, in one uniform order of arrangement.

93. The solid conductors most capable of exciting galvanism, are the metals and charcoal; and the most efficient imperfect conductors are certain saline solutions.

94. The effects of the simple galvanic circle on the animal body, are the production of a sensation of light when applied to the eye; of an acid taste on the tongue; and the excitement of the muscles through the medium of the nerves.

95. The pile, when well constructed, besides these effects, also gives a shock and spark resembling those of electricity, and is the most powerful instrument of analysis with which we are acquainted.

## MAGNETISM.

96. If an oblong piece of iron be suspended freely, it will assume a determinate position with regard to the axis of the earth.

97. When the same end always points in the same direction, it is said to possess polarity, or to be a magnet.

98. The similar poles of two magnets repel each other, and the dissimilar poles attract each other, with a force decreasing as the distances increase.

99. Any piece of iron, when in the neighbourhood of a magnet, is a magnet; and its polarity is so disposed, that the magnet and iron mutually attract each other.

100. Magnetism does not seem to affect sensibility or irritability, or to influence chemical action.

## OXYGEN.

101. *Oxygen* is the principle on which most of the chemical qualities of atmospheric air depend. Its tendency to combination is so strong, that it has never been procured in a separate

state. Oxygen gas, or the combination of oxygen with caloric, is its most simple form. This is permanently elastic, compressible, transparent, inodorous, and insipid. 100 cubical inches at 60° Fahrenheit, and 30 inches mercurial pressure, weigh about 34 grains. Its specific gravity in relation to water is 0.00135; and in relation to hydrogen, its specific gravity is 15 to 1; its power of refracting light 1958, hydrogen being 1000; and its capacity for heat 4.7, water being assumed as unity. It supports inflammation, is necessary for respiration and vegetation, and is decomposed in all these processes; it constitutes 0.21 of the bulk of atmospheric air. Water at 60° takes up $\frac{1}{27}$ of its bulk of the gas. Oxygen is also a constituent in water, in all acids and metallic oxides, and in almost all animal and vegetable substances. It is separated from many of its combinations by the sun's rays.

102. *Oxygenizement* is an example of chemical union, and is subjected to all the laws of affinity. It requires the presence and contact of oxygen, and of another substance possessing affinity for it.

103. The term *Combustion* has been, by the French chemists, incorrectly extended to all these combinations; for, in common language, that word is applied to cases in which oxygen is not an agent, and always supposes the production of heat and light, although in numberless instances of oxygenizement these phenomena do not appear.

104. Oxygenizable bases attract oxygen with very different degrees of force. This attraction is much influenced by temperature. Thus charcoal, which at ordinary temperatures seems to possess no attraction for oxygen, unites with it rapidly and almost inseparably, when heated to ignition.

105. In many instances, oxygenizement is so strongly opposed by cohesion, that it does not take place unless assisted by a degree of heat sufficient to melt or vaporize the oxygenizable base.

106. It is also often accompanied by the extrication of caloric and light in a very conspicuous degree. To these the term combustion should be confined; and only such oxygenizable bases as are capable of exhibiting these phenomena are combustible. These phenomena depend upon the new compound having a weaker affinity or less capacity than its constituents for light and caloric, which are therefore extricated.

107. If the combustible body be vaporized, flame is produced, and the process is then denominated *inflammation.*

108. By its union with oxygenizable substances, oxygen undergoes various changes in its properties. In many instan-

ces the compounds of oxygen are fluid or solid, opaque, coloured, incapable of supporting inflammation, and deleterious to animal or vegetable life. The changes which the oxygenizable bases undergo, are no less conspicuous. Their form, colour, taste, odour, density, permeability to light and electricity, specific caloric, and, finally, their affinities, are often totally altered.

109. When, in consequence of oxygenizement, any substance acquires a sour taste, and the properties of converting vegetable blues to red, and of saturating or destroying the characteristic properties of alkalies and earths, it is said to be acidified, and such compounds are termed *Acids*. In general, they combine with water, in almost any proportion, without suffering any change in their properties, except what depends on dilution.

110. When, on the contrary, a base by oxygenation acquires a harsh, austere, and urinous taste, and the properties of converting vegetable blues to green, and of saturating or destroying the characteristic properties of acids, it may be said to be alkalized, and the compounds are termed *Earths* or *Alkalies*.

111. Earths, in general, are characterized by total want of inflammability, infusibility, fixedness, a specific gravity less than five, inalterability, whiteness, dryness, brittleness, sparing solubility in water, and, in general, insipidity and want of smell, capability of forming chemical compounds with acids, alkalies, sulphur, phosphorus, and oils, and fusibility when mixed with each other, or with alkalies, into colourless glasses, enamels, or porcelains.

112. Alkalies are a class of bodies which are commonly defined to be incombustible, soluble in water, caustic, and capable of neutralizing the acids, of combining with alcohol, oils, earths, sulphur and phosphorus, and of changing vegetable blues and reds to green: but as many of these properties are possessed in a greater or less degree by substances usually classed with the earths, and as there is a continual gradation from the insipidity, insolubility, and infusibility, of silica, to the causticity, solubility, fusibility, and comparative volatility of potass, they may be both included under the name of Salifiable Bases.

113. When the oxygenized substance does not acquire these properties it is termed an *Oxide*; but many oxides have some of the properties of acids or earths.

114. Many oxides are capable of combining with additional doses of oxygen; those which have only one portion are

called *Protoxides*, with two *Deutoxides*, with three *Tritoxides*, and when fully saturated they get the name of *Peroxides*.

115. Oxygen is capable of combining at the same time with two or more substances; and the oxides or acids which result from such combinations are termed Oxides or Acids with a double or triple base.

116. In general, the bases which are least simple, unite with oxygen in the greatest variety of proportion.

### CHLORINE.

117. *Chlorine*, Sir H. Davy, (oxymuriatic acid gas of other chemists,) is of a yellowish-green colour, has an extremely disagreeable smell, 100 cubical inches weigh 76 or 77 grains, its specific gravity to hydrogen being 33.5 to 1; is irrespirable, but supports combustion. It is not changed by heat or cold, or electricity, and when perfectly dry does not act on vegetable colours; but they are quickly destroyed by it when vapour or moisture is present. Water at 60 absorbs about double its volume, weighs 1.003, freezes at 40°, and acquires a strong acrid taste, and disagreeable smell.

Combustibles, by their union with chlorine, have their properties totally altered, and the new compounds are now termed *Chlorides*.

Chlorine combines with oxygen in four proportions.

118. *Protoxide of chlorine (Euchlorine)* was first obtained in a separate state by Sir H. Davy. It is a gas of a bright yellow-green colour, having somewhat the smell of burnt sugar. It is not respirable. 100 inches weigh 74 or 75 grains. Even the heat of the hand causes it to explode, 50 parts expanding to 60, consisting of 40 chlorine and 20 oxygen. Metals do not burn in it, but phosphorus and sulphur decompose it. It gradually destroys vegetable colours. Water takes up eight or ten times its volume, and acquires a lemon colour, and a strongly acrid taste, approaching to sour.

119. *Chlorine*, with additional doses of oxygen, forms also a deutoxide, and two acids, the Chloric and Perchloric.

### IODINE.

120. *Iodine* is of a black-grey-colour, and crystallized either in micaceous plates, or broad and brilliant rhomboidal plates, or long octohedrons. Its fracture is lamellated and greasy. It is very friable, and may be reduced to impalpable powder.

It destroys vegetable colours, and stains the skin a deep-orange. Its sp. gr is 4.948. It does not conduct electricity. It melts at 225 F. and boils between 335° and 355°. Its vapour is of a beautiful violet colour, and smells like chlorine, but weaker. Its taste is acrid, hot and durable, and it acts as a poison. Water dissolves a seven millionth part of its weight, and acquires an orange-yellow colour, and when combined with water, it is vaporized along with it at 212°.

Iodine combines with combustible bodies, and these compounds are now called *Iodides*.

121. *Iodic acid* is the name now given to the only compound known of iodine and oxygen, that analogous to chloric acid. It is a white semitransparent solid, without smell, of a strong astringent sour taste. Sp. gr. considerable. Boils about 600 without decomposition. Deliquescent. Very soluble in water, and may be volatilized along with it unchanged. It alters vegetable colours, detonates with inflammables, and corrodes metals.

122. *Chloriodic acid* is the combination of iodine with chlorine. It has a yellow colour, and becomes orange on fusion. It is very volatile, deliquesces, and its solution destroys vegetable colours.

### FLUORINE.

123. *Fluorine* has never been obtained in a separate state, and its existence rests upon analogical reasons.

### NITROGEN, (AZOTE).

124. *Nitrogen*, or *azotic gas*, constitutes 0.79 parts by bulk of the atmosphere; but as it has few attractions at ordinary temperatures, its principal effect on the chemical properties of the atmosphere seems to be the dilution of the oxygen gas, which in its pure state would be more active than is consistent with the economy of nature. It is permanently elastic, compressible, inodorous, and insipid; it converts very delicate vegetable blues to green; 100 cubic inches weigh between 29 and 30 grains; its specific gravity is 0.0012, water being 1; or 13, hydrogen gas being 1; it is unable to support respiration, vegetation or combustion; it is acidifiable; it dissolves phosphorus and carbon in small quantities, and water absorbs $\frac{1}{75}$ of its volume. Its number is 13 or 26.

125. *Atmospheric air* consists of 21 parts of oxygen gas, and of 79 of azotic gas by measure, or 23.47, and 76.53 by

weight; it is transparent, compressible, and permanently elastic; its specific gravity is 0.00123, water being unity; or 13.8, hydrogen being unity; 100 cubic inches weighing 31 grains: it is inodorous and insipid, respirable, and capable of supporting inflammation. The atmosphere also contains other gases, vapour, &c.

126. *Protoxide of azote*, or *nitrous oxide gas* is composed of 15 in weight of oxygen, and 26 of nitrogen, or of equal volumes of their gases. It does not change vegetable colours; 100 cubic inches weigh between 48 and 49 grains; its specific gravity, hydrogen being 1, is 21; it suffers no diminution when mixed with oxygen gas. Water absorbs nine-tenths of its bulk, at a mean temperature. It does not combine directly with alkalies; it supports combustion; and its respiration, when perfectly pure, or mixed with atmospheric air, produces the highest excitement of which the animal frame seems capable.

127. *Deutoxide of azote*, *nitric oxide gas* (nitrous gas) consists, according to Sir H. Davy, of 26 nitrogen and 30 oxygen, or of one volume of nitrogen and two of oxygen gas. It does not change vegetable colours; 100 inches weigh about 32 grains; its specific gravity to hydrogen is 14. When mixed with half its bulk of oxygen gas, the compound condenses into red fumes (nitrous acid,) which are entirely absorbed by water. The quantity of oxygen gas which any air contains is sometimes estimated by the diminution of volume which occurs, after a due proportion of nitrous gas has been added. Water absorbs about one-twentieth of its bulk of this gas. It is not inflammable, and only in very few instances supports combustion. It is noxious to vegetation, and its respiration is fatal to animals.

128. *Nitrous acid gas* consists, according to Davy, of 2 measures of nitric oxide gas, and one of dry oxygen gas, condensed to half their volume. It has a deep orange colour, disagreeable smell and sour taste. It reddens litmus paper, and gives a yellow colour to animal substances. 100 cubic inches weigh 65.3 grains, and its specific gravity to hydrogen is 28. It is rapidly absorbed by water, which acquires a tint of green, by ether, oil and sulphuric acid. Its compounds are nitrites.

129. *Hydro-Nitrous acid* is of a brown or red colour, exceedingly volatile, and emitting an intolerable and suffocating odour. By the addition of water, its colour is successively changed to blue, green and yellow.

130. *Hydro-Nitric acid* (aqua fortis) consists of nitric acid combined with water. It is liquid, colourless, and trans-

parent. It is very corrosive, and tinges the skin of a yellow colour. When most concentrated, its specific gravity is 1.5543, and it contains 15 *per cent.* water. It produces heat when mixed with water, and absorbs water from the atmosphere. Acid of 1.42 rises unaltered at 248° Fahrenheit. Below 1.4 it strengthens by being boiled, and above 1.45 it becomes weaker. It is decomposed by many substances. Light converts it in part into nitrous acid gas. When highly concentrated, it sets fire to oils, to sulphuretted hydrogen gas, to iron-filings, and to zinc, bismuth and tin, when poured on them in a state of fusion. It oxygenizes all the metals, except gold, platinum, and titanium. It consists of five parts, by bulk, of oxygen, and one of nitrogen, combined in the strongest acid with one, and in that of 1.42 with two of water. Its saline compounds are called nitrates.

131. *Chloride of azote.* Nitrogen forms a very singular compound with chlorine. It is obtained by confining chlorine over a saturated solution of nitrate of ammonia, at a very low temperature. The gas is absorbed, and a heavy oil falls, which explodes violently when put in contact with olive oil.

132 *Iodide of azote* is a blackish powder, which detonates with great force spontaneously, when dry, and by a slight pressure under water.

### HYDROGEN.

133. *Hydrogen gas* is often found collected in mines and caverns. It is permanently elastic and compressible. 100 cubic inches weigh $2\frac{1}{4}$ grains. Its specific gravity, in relation to water, is 0.000094, being the lightest body with which we are acquainted. It is highly inflammable, burning with a blue flame, when kindled in contact with oxygen gas or atmospheric air, and detonating when mixed with them. It extinguishes flame, and is deleterious to animal life. It dissolves sulphur, phosphorus, carbon, and some of the metals, forming with them peculiar fetid gases. In estimating the specific gravity of the gases, being the lightest of them, it is assumed as unity.

134. *Water* consists of hydrogen combined with oxygen, in the proportion of 14.42 to 85.58 by weight, or two of hydrogen to one of oxygen by volume. Water is transparent, colourless, inodorous, and insipid. As water is assumed as the standard, or unity, in all tables of specific gravity of fluids and solids, it is necessary to know that a cubic inch of it weighs, at 30 inches barometer, and 60° thermometer, 252.422 grains. At 32° it exists in a solid form, and is crystallized. At 212° it expands to 2000 times its bulk, and is con-

verted into a very elastic vapour. It absorbs small quantities of the simple gases, especially oxygen. It dissolves several of the salifiable bases, and in some degree all saline bodies, and is essential to their crystallization. It is composed and decomposed in many instances, and its chemical agency is almost universal.

135. *Muriatic* or *Hydro-chloric acid gas* is transparent and colourless. It destroys life, and extinguishes flame. 100 cubic inches weigh between 39 and 40 grains; or its sp. gr. is 0.002315; water being unity; or 17, hydrogen gas being 1. According to Sir H. Davy, it consists of eqnal volumes of chlorine and hydrogen gas. It decomposes alcohol and oil, and destroys putrid exhalations. Water is capable of absorbing about an equal weight of the gas. Its specific gravity is then 1.500; it is generally of a pale yellow colour, is very volatile, and emits white fumes of a peculiar unpleasant odour. It is further oxygenized by the nitric acid, or, according to Sir H. Davy, de-hydrogenated. *Officinal:* Muriatic acid.

136. *Hydro iodic acid* is colourless, but has a strong smell and taste. It consists of iodine and hydrogen. It extinguishes combustion, and reddens turnsole. It has a strong affinity for water, forming fumes with that of the atmosphere, and being rapidly absorbed by it. Chlorine decomposes it, becoming muriatic acid, while the iodine is disengaged in violet vapour. Potassium, zinc, and other metals, absorb its iodine, and disengage the hydrogen.

137. *Hydro-fluoric acid* is colourless, does not congeal at —4° Fahr., and boils at a moderate heat, but evaporates very quickly when in contact with the air. Its vapour is very pungent and deleterious. It produces great heat when dropt into water. It acts with great violence on the skin, occasioning great pain and general irritation. It is converted, by its union with a small proportion of silica, into a permanent gas, which till lately was considered to be pure fluoric acid.

138. *Ammonia* consists of 1 part of nitrogen and 3 of hydrogen by bulk, or 3 of hydrogen and 13 of nitrogen by weight. It exists in its purest form combined with caloric as a gas, which is perfectly transparent and colourless, elastic and compressible: specific gravity 8 to hydrogen; or 100 inches weigh 18 grains; has a urinous and acrid odour, irritating the nostrils and eyes, and an acrid and caustic taste; does not dissolve animal substances; is irrespirable; extinguishes flame; colours vegetable blues green; and is decomposed by being transmitted through a red-hot tube, and by the electric spark, into its constituent gases; and by oxygen and atmospheric air at a red heat; and by oxymuriatic acid (chlorine,)

it is converted into water and nitrogen gas. It is absorbed without change by porous bodies; it dissolves sulphur and phosphorus, and combines readily with water in all its states. Water, at a mean temperature and pressure, is saturated by 670 times its volume of gaseous ammonia, is thereby increased in bulk, and acquires the specific gravity of 0.875. Ammonia combines with all the acids, forming neutral salts. It is formed during the putrefactive fermentation, and is commonly classed with the alkalies. *Officinal.*

139. *Iodide of ammonia.* Dry ammoniacal gas is absorbed rapidly by iodine, and with great production of heat. It is a very viscid liquid, of a metallic appearance; by excess of ammonia it loses its lustre, part of its viscidity, and becomes of a very dark red-brown colour. It is not detonating, but becomes so when moistened.

### CARBON.

140. *Carbon*, in a state of great purity and extreme aggregation, is well known by the name of *diamond.* It possesses a very high degree of lustre, transparency, hardness, and refractive power. It is crystallized, and generally colourless. Its specific gravity is about 3.5. It is insoluble in water, and can neither be melted nor vaporized by caloric. It is a non-conductor of electricity. It is not acted upon by any chemical agent, except oxygen, at very high temperatures. When exposed in oxygen gas to the rays of the sun, concentrated by a very powerful lens, its surface becomes sensibly blackened; it is ignited, and at last consumed. The result of this combustion is carbonic acid gas, which is exactly equal in volume to the oxygen gas consumed; and 100 parts of it consist, according to Messrs Allen and Pepys, of 28.6 of carbon, and 71.4 of oxygen by weight. It combines with iron, forming steel. It is a constituent of almost all animal and vegetable substances; and is obtained from them by exposing them to heat in close vessels.

141. *Plumbago* and *incombustible coal* are carbon in a state of less aggregation and somewhat impure. In the former, it is combined with about $\frac{1}{25}$ of iron; in the latter with earthy matter. The most remarkable known property of these substances is the very high temperature necessary for their combustion.

142. Common *Charcoal* of wood is another, and the commonest form of carbon. It is obtained in the form of solid masses, of a black colour, and more than twice as heavy as water. It has neither smell nor taste. It is brittle, and ne-

ver crystallized; it rapidly attracts moisture, so as to acquire from 12 to 14 *per cent* of weight. When dry, it also absorbs several times its bulk of any gas in which it is placed. It absorbs light strongly, is refractory in the fire, insoluble in water, and a bad conductor of caloric, but an excellent one of electricity. At a red heat, it burns rapidly in oxygen gas; 28.6 of charcoal, and 71.4 of oxygen, forming 100 of carbonic acid gas. It also burns in atmospheric air, but less vividly. In vacuo, and in gases on which it has no action, it is slowly volatilized by the highest power of galvanism. Common charcoal always furnishes a little water on its combustion, but charcoal from the decomposition of oil gives carbonic acid alone. *Officinal.*

143. *Carbonic oxide gas* is carbon in its first degree of oxidation. It is invisible and elastic; 100 cubic inches weigh about 30 grains, or its specific gravity to hydrogen is 13.2. It does not support combustion or respiration. With oxygen gas it burns with a lambent blue flame, and is converted entirely into carbonic acid, without producing any moisture. It has no affinity for lime. It consists of about 4 carbon and 56 oxygen. When mixed with an equal bulk of chlorine, and exposed to the direct rays of the sun, they unite, are condensed to one-half, and form a peculiar gas discovered by Dr John Davy.

144. *Carbonic acid gas* is transparent, colourless, without smell, irrespirable, and incapable of supporting combustion. 100 cubic inches weigh 47 grains, or its specific gravity to hydrogen is 20.7. Water at 41° absorbs an equal bulk of it, and acquires a specific gravity of 1.0015, an agreeable acidity, and a sparkling appearance, especially if heated to 88°. It is separated from water by freezing or boiling. It is also absorbed by alcohol, volatile and fixed oils. It contains 28.6 carbon, and 71.4 oxygen. Its compounds are called carbonates.

145. *Carburetted hydrogen gas* is the gas evolved in stagnant waters. It has no taste, but a disagreeable empyreumatic smell. 100 cubic inches weigh about 17 grains, and its specific gravity is rather less than 8. It is incapable of supporting respiration or combustion. It burns with a bright yellowish flame, comsuming two parts of oxygen gas. It detonates with two of chlorine by the electric spark, forming four of muriatic acid gas.

146. *Supercarburetted hydrogen* or *Olefiant gas.* 100 cubic inches weigh between 29 and 30 grains, or its specific gravity is 13. It does not support respiration or combustion. It burns with a splendid white flame, and detonates by the electric

spark with great violence, with three volumes of oxygen. With an equal volume of chlorine, it forms a fluid resembling an oil.

147. *Chloride of carbonic oxide* was discovered by Dr John Davy, who called it phosgene gas. It consists of equal volumes of chlorine and carbonic oxide gases; is colourless, has a suffocating smell like chlorine, affects the eyes. It reddens turnsole. 100 cubic inches weigh 111.91 grains. It does not support combustion, and is not decomposed by any of the simple combustibles, but is acted upon by zinc, antimony, arsenic, and other metals, which absorb the chlorine, and disengage the carbonic oxide, while the oxide disengages carbonic acid. It is decomposed by water, and alcohol dissolves twelve times its volume.

148. *Carbo-chloride of ammonia.* The preceding gas unites with four times its bulk of ammoniacal gas, forming a neutral salt, solid, white, volatile, pungent, deliquescent, and very soluble in water, which is decomposed by the sulphuric, nitric, muriatic and phosphoric acids.

149. *Cyanogen* is the name given by Gay-Lussac to a combination of azote with carbon. It is a colourless gas, of a strong disagreeable smell. Sp. gr. 1.8064. It burns with a purplish-blue flame, and is not decomposed by exposure to a red heat. It is absorbed by water and alcohol, and its solutions redden litmus.

150. *Chloric ether* is limpid and colourless, and has the appearance of an oil. Its smell is agreeable, and its taste sharp and sweetish. Its sp. gr. 1.2201, and it boils at 152°. It consists of equal bulks of chlorine and olefiant gas.

### BORON.

151. *Boron*, the recently discovered base of boracic acid, is a friable, dark olive, opaque powder, without taste or smell. It is insoluble in water, and a non-conductor of electricity.—An intense heat has no action on it, unless atmospheric air or oxygen be present. But heated strongly in contact with air it burns and forms dry boracic acid. In oxygen it burns with scintillation. It combines with about an equal weight of oxygen. It emits white fumes when gently heated in chlorine.

152. *Boracic acid* crystallizes in small shining flakes, with little taste, and slightly affecting turnsole; sp. gr. 1.479; fixed and vitrifiable in the fire; soluble in 50 parts of boiling water and in alcohol, to which it imparts the property of burning, with a yellow flame.

153. *Chloride of boron* has been lately examined. Boron burns in chlorine gas with a brilliant white flame, and coats the vessel in which it is burnt with a white substance, which by washing yields boracic acid.

154. *Fluo-boric acid gas* is invisible, extinguishes combustion, reddens vegetable blues strongly, is rapidly absorbed by water, and detects, by the formation of dense vapour, hygrometric water in air. It rapidly decomposes animal and vegetable substances. Liquid fluo-boric acid resembles sulphuric acid in causticity and appearance, and in its relations to heat.

### SULPHUR.

155. *Sulphur* is a crystallizable solid, of a yellow colour; little sensible taste; peculiar smell when rubbed or heated; specific gravity 1.99; brittle; electric; fusible at 226°; burning with a pale blue flame at 302°; and with a bright white flame at 570°; and capable of combining with different proportions of oxygen. It is found pure in the vicinity of volcanoes, and exists in many minerals, and in animal substances. *Officinal.*

156. *Sulphurous acid gas* is colourless, incapable of maintaining combustion, and deleterious when respired. It has a strong suffocating odour; 100 cubic inches weigh about 68 grains; its specific gravity to hydrogen is 30 to 1. It whitens many animal and vegetable substances. Water at 54° rapidly absorbs 30 times its bulk of this gas, and when saturated, acquires the specific gravity of 1.0513. It is again expelled from the water by heat, but not by freezing. When water is present it is converted by oxygen gas into sulphuric acid. It is decomposed by hydrogen, carbon, and sulphuretted hydrogen gas, when assisted by heat. It oxidizes iron, zinc, and manganese. It consists of equal weights of sulphur and oxygen.

157. *Hydrosulphuric acid* is also composed of sulphur and oxygen. It is a dense liquid; specific gravity 1.85; slightly viscid; transparent and colourless; without smell; of a strong acid taste. It freezes at —36°, and boils at 590°. It has a strong attraction for water, absorbing it rapidly from the atmosphere, and producing considerable heat when mixed with it. It is decomposed by most inflammable substances. It does not oxidize gold, platinum, tungsten, or titanium. It decomposes the alkaline and earthy sulphurets, and reduces all organic substances to charcoal. In medicine it is a powerful refrigerant and antiseptic. It consists of 30 sulphur, 45 oxygen, and 17 of water. What was called Glacial sulphuric

acid, consists, according to Sir H. Davy, of 4 volumes of sulphurous acid gas, and 3 of nitrous acid gas, probably in two or three proportions, with a single proportion of water. *Officinal.*

158. *Chloride of sulphur* was first formed by Dr Thomson. It is a fluid, appearing red by reflected, and yellowish-green by transmited light. Sp. 1.7. It smokes in the air, has the smell of seed-weed, and affects the eyes like peat smoke. It does not redden perfectly dry litmus paper, but is decomposed by water.

159. *Sulphuretted hydrogen gas* consists of one sulphur and two hydrogen; 100 inches weigh 36 or 37 grains, or its specific gravity to hydrogen is 16. It has the odour of rotten eggs; is not respirable; burns with oxygen gas without exploding, and deposites sulphur; an equal volume is absorbed by water, and is the mode in which sulphur exists in mineral waters; reddens vegetable blues; and in its affinities, and the crystallizability of its compounds, it resembles the acids. *Officinal.* Hydrosulphuret of ammonia.

160. *Iodide of sulphur* is formed by exposing them to a gentle heat. It resembles in appearance sulphuret of antimony, and is easily decomposed by heat, the iodine being sublimed.

161. *Sulphur of carbon* is a transparent colourless liquid, of a fetid smell and acrid taste; sp. gr. 1.263. It boils at 115 F., but evaporates rapidly at 60, when in contact with the air producing intense cold. It is exceedingly inflammable.

162. *Sulphurets* are solid opaque bodies, of considerable specific gravity; decomposable by heat, water, and the acids.

*a.* The alkaline and earthy sulphurets have a red or brownish-red colour, and by solution in water are immediately converted into hydrosulphurets. *Officinal.* Sulphuret of potass.

*b.* The metallic sulphurets have neither taste nor smell, are often possessed of metallic brilliancy, and are conductors of electricity. *Officinal.* The sulphurets of antimony, of mercury, of iron.

Hydro-sulphurets are soluble in water, and crystallizable, decomposed by the atmosphere and acids.

## PHOSPHORUS.

163. *Phosphorus* is a semi-transparent solid, slightly brilliant, and of a waxy consistence; specific gravity 1.79; taste in some degree acrid and disagreeable; smell alliaceous. It

is brittle under 32° : its fracture is vitreous, brilliant, and sometimes lamellated; above 32° it softens a little, becomes ductile about 90°, melts at 99°, becoming transparent like a white oil; at 180° begins to be vaporized, and at 554° boils. It is crystallizable into prismatic needles or long octohedrons.

It exists in many minerals, and is obtained from bones and other animal substances. In its solid state, phosphorus is not acted upon by pure oxygen gas; but when melted, burns in it at 80° with a dazzling splendour, absorbing about half its weight of oxygen, and forming phosphoric acid. In atmospheric air it undergoes a slow combustion at 43°, emitting light in the dark, but without the production of sensible heat, absorbing a portion of oxygen, and forming phosphorous acid; at 148° it burns rapidly, but less brilliantly than in oxygen gas, forming phosphoric acid. It is therefore always kept immersed in boiled water; but even there its surface is oxidized, becoming white and opaque.

164. *Oxide of phosphorus*, white flakes which burn when heated, and attract moisture, and are acidified by exposure to air.

165. *Hydro-phosphorous acid* is a white crystalline solid, but water is essential to its composition. It contains four of phosphorous acid and two of water. It is readily soluble in water. The solution has a fetid odour, and disagreeable taste; and gives out a thick white smoke and vivid flame when strongly heated. It is decomposed by ignited charcoal, and by heating it in contact with ammonia.

166. *Phosphoric acid* is also composed of phosphorus and oxygen. It is crystallizable, fusible, and vitrescent. Its specific gravity is 2.687. It dissolves in water, producing great heat. It readily attracts moisture from the atmosphere, and then its specific gravity becomes 1.417. It is decomposed at a high temperature by hydrogen and carbon, and by several of the metals. It consists of 40 phosphorus and 60 oxygen.

167. Phosphorus burns in chlorine with a pale flame, throwing off sparks, and forms two compounds according to their proportions. *Protochloride of phosphorus* is a fluid as clear as water, to which its sp. gr. is 1.45. It emits acid fumes when exposed to the air. It does not redden dry litmus paper. Its vapour burns in the flame of a candle. It dissolves phosphorus when heated. It is decomposed by water, forming phosphorous and muriatic acids, and by ammonia, depositing a part of its phosphorus. It is converted by chlorine into the perchloride. It consists of one proportion of phosphorus, and two of chlorine.

168. *Perchloride of phosphorus* is a snow-white substance, crystallizable, very volatile, but fusible under pressure. It produces flame when exposed to a lighted taper. Its vapour reddens litmus paper. It forms an insoluble compound with ammonia, having characters analogous to an earth. It is decomposed in a red-hot tube by oxygen, and it acts violently on water, forming phosphoric and muriatic acids. It consists of one of phosphorus and four of chlorine.

169. *Phosphuretted hydrogen gas* varies in specific gravity from 4 to 7, hydrogen being 1. It has a disagreeable alliaceous smell It explodes with a most intense white light in oxygen gas. It detonates with a brilliant green light in chlorine. Water absorbs about $\frac{1}{40}$ of its volume; and it is decomposed by electricity, heated metals, &c.

170. *Hydrophosphoric gas*, disagreeable smell specific gravity 12. to hydrogen. Water absorbs $\frac{1}{8}$ of its volume. It explodes with a white flame in chlorine, one volume absorbing four of the latter. It does not explode spontaneously with oxygen, but detonates violently when heated to 300 Fahrenheit, three volumes absorbing more than five.

171. *Sulphuretted phosphorus* contains various proportions of its elements. It is exceedingly inflammable and more fusible than either of its constituents. 1 of phosphorus and 3 of sulphur congeal at 100 Fahrenheit. 2 of phosphorus and 1.5 of sulphur remain liquid at 40°, and 8 of phosphorus and 1 of sulphur at 68°.

172. Nitrogen gas dissolves phosphorus, forming a fetid gas, which inflames at a low temperature.

173. *Prot-iodide of phosphorus.* Iodine unites with phosphorus in various proportions, disengaging heat but no light. 1 of phosphorus with 4 iodine gives a compound of a red-brown colour, not fusible at a heat considerably above 212°, scarcely acted on by water, but soluble in potass, with disengagement of phosphuretted hydrogen gas; burning at an elevated temperature in the air like phosphorus, and only shewing traces of iodine by the action of chlorine.

174. *Per-iodide of phosphorus.* 1 of phosphorus with 8 of iodine is of a red orange-brown colour, fusible at about 212, and volatilized at a higher temperature. It is decomposed by water, disengaging phosphuretted hydrogen gas, while flakes of phosphorus are precipitated, and the water contains phosphorous acid and hydro-iodic acid. 1 of phosphorus with 16 of iodine is a crystallized substance of a grey black colour, fusible at 86°, decomposing water without disengagement of phosphuretted hydrogen gas. In whatever propor-

tions phosphorus and iodine are mixed, they exhale, on being moistened, vapours of hydro-iodic gas.

METALS, AND METALLIC OXIDES.

175. Metals are crystallizable; their form depends on the regular tetrahedron or cube; their surface is specular; they are perfectly opaque, even when melted; their colour is various; their lustre peculiar and shining, or splendent; their hardness various, but at least considerable; many of them are brittle, others possess malleability and ductility in a very great degree, and some are scissile, flexile, or elastic; their fracture in general is hackly; their texture compact, fibrous or foliated; many of them are remarkably sonorous; their specific gravity greater than 5, or remarkably light; they possess no smell or taste, unless when heated or rubbed; they are the best conductors of caloric and electricity, are powerful agents in producing the galvanic phenomena, and a few of them are the only substances which exhibit the phenomena of magnetism. By the action of caloric they are melted, but with different degrees of facility, and some of them may be vaporized. Except iron and platinum, they melt suddenly, without undergoing any intermediate state of softness; and when melted, their surface is convex and globular. They are insoluble in water; but some of them decompose it, and are oxidized by it.

176. They are oxidized with different degrees of facility, some by mere exposure to air, and others seem almost to resist the action of heat and air. Their oxidizability is always increased by increase of temperature. Their oxides are in the form of powder, laminæ, or friable fragments; sometimes crystalline; of various colours, determinate with regard to each metal; possess greater absolute weight; are refractory, or fusible into glass; insipid, or acrid and styptic; in general insoluble in water; and combine either with acids and alkalies, or only with one of these. Some of them are disoxygenized by light alone, others by caloric, and others require hydrogen, carbon, &c.

Most of the metals are capable of combining with different proportions of oxygen. Dr Thomson proposes to call the oxides with a minimum of oxygen, Protoxides; and with additional proportions, Deutoxides, Tritoxides, &c. in succession; and the oxides with a maximum of oxygen, Peroxides.

177. Chlorine combines with many of the metals, constituting the substances formerly called *muriates* and metallic butters. With the metal it unites without decomposition, but

when an oxide is exposed to the action of muriatic acid, the hydrogen of the acid and oxygen of the oxide combine to form water, while the metal and chlorine unite. Some metals combine with chlorine in more proportions than one. Sir H. Davy distinguishes them by adding to the name of the metal the termination *ane* when it is combined with a smaller proportion of chlorine, and *ana* or *anea* when with a greater, as phosphorane, phosphorana, stanane, stananea, ferrane, ferranea, &c. but the terms of *Protochloride* and *Perchloride*, used by other chemists, are preferable.

178. Hydrogen gas is capable of holding arsenic, zinc, iron, tellurium, potassium, and boron, in solution ; and all these gases contain their own bulk of hydrogen gas.

179. Carbon unites only with iron.

180. The metallic phosphurets are fusible, brilliant, brittle, granulated, lamellated, scarcely combustible, and permanent.

181. The sulphurets are brittle ; crystallizable in large brilliant and metallic laminæ, more easily fusible that the refractory metals, but less easily than the very fusible metals ; decomposible by heat, humidity, and the acids.

182. The iodides of the easily oxidizable metals, as zinc, iron, tin, antimony, decompose water ; those of lead, silver and mercury do not. The iodide of mercury has a fine red colour, or yellowish-green, according as the iodine or mercury predominates. The former melts, and is sublimed in rhomboidal plates of a golden yellow, which on cooling become of a brilliant scarlet.

183. The mixtures of the metals with each other are termed *Alloys :* those in which mercury is contained are *Amalgams.* They acquire by mixture new properties, and are in general more fusible than their components. The reguline metals are not soluble in the acids; but when acted upon by them are first oxidized, and then dissolved. The metallic oxides, by fusion, colour glasses and enamels.

### ALKALIZABLE METALS.

The heavier earths, and even the alkalies, have long been supposed by different chemists to be metallic oxides, and were even stated to have been reduced to their metallic form. But their supposition rested only on the vaguest analogies, and their experiments were completely fallacious. The merit of discovering the metallic bases of the earths and alkalies belongs to Sir H. Davy, to whose ingenuity and skill, in applying the powerful agency of galvanism, we are indebted for

the most unexpected conclusions ever obtained in experimental chemistry.

184. *Potassium,* the base of potass, is a white metal, brittle and crystallized; in its section resembling polished silver; and at 150° perfectly fluid, very much resembling quicksilver. At a red heat it is converted into vapour. Its specific gravity is between 8 and 9, water being 10. Exposed to the air, it attracts oxygen, and becomes covered with a crust of potass; when gently heated, it burns with an intense heat, and a red light. It explodes and inflames with water, and even with ice. It acts upon all bodies containing water or much oxygene. It burns vividly in chlorine. It is soluble in hydrogen gas, forming a compound which inflames with atmospheric air. It combines with sulphur and phosphorus, and the metals, forming readily oxidizable compounds.

185. *Protoxide of potassium* scarcely known; of a greyish colour, effervesces with water without inflaming.

186. *Potassa,* (Sir H. Davy,) a difficultly fusible substance of a grey colour, vitreous in its fracture, dissolving in water, without effervescence, but with much heat, forming an alkaline solution.

187. *Potass* (hydrat of potassa) is a solid white substance, containing 90 potassa and 17 water, which cannot be separated by heat; extremely acrid to the taste; unctuous to the feel, but highly caustic; destroying the skin, and dissolving all soft animal substances. It is deliquescent, and soluble in half its weight of water at 58° Fahrenheit; it is fusible, and may be vaporized, but is perfectly incombustible; it is capable of crystallizing into very long quadrangular, compressed prisms, terminated by sharp pyramids; it changes vegetable blues to green, and combines with all the acids, oils, sulphur, sulphuretted hydrogen, and the earths. It is obtained from the ashes of vegetables, and exists in some minerals. *Officinal.*

188. *Orange oxide of potassium,* fusible, the result of the slow combustion of potassium in oxygen or air. It supports the combustion of inflammable bodies, supplying the oxygen. It is decomposed by water and carbonic acid, oxygen being evolved.

189. *Chloride of potassium* (muriate of potass.) When muriatic acid and solution of potass are mixed and heated to redness, the hydrogen of the acid and the oxygen of the alkali are set free as water, while the metal and the chlorine combine to form the substance known by the name of muriate of potass. Chlorine also decomposes potassa and the

orange oxide, expelling its oxygen, and potassium attracts chlorine from hydrogen and phosphorus. *Officinal.*

190. *Sodium*, the base of soda, resembles in its appearance silver, has great lustre, and is a conductor of electricity. It fuses at 200° Fahrenheit. It is not volatilized by the heat which melts plate glass. Its specific gravity is 0.9348, water being 1. It absorbs oxygen slowly from the atmosphere, and at a high temperature burns with bright sparks. It decomposes water with effervescence, and is inflamed by nitrous acid.

191. Protoxide of sodium, scarcely known; of a dark grey colour.

192. *Soda*, of a grey colour, and vitreous fracture, a non-conductor of electricity.

193. *Hydrat of soda*, formerly considered as pure soda, contains 22 *per cent.* of water, which cannot be separated by heat, of a greyish white colour, urinous taste, and burning causticity, acting with considerable violence on animal matter. Water, in a certain proportion, when thrown upon it, is absorbed and solidified, with the disengagement of caloric, and a lixivial smell. A larger quantity dissolves it. From the atmosphere it absorbs moisture and carbonic acid, becoming less caustic. In the fire it melts like an oily substance; boils, and is converted into vapour, but is incombustible. It is crystallizable into transparent prismatic crystals. It changes vegetable blues to green; unites with all the acids, oils, sulphur, sulphuretted hydrogen, phosphorus, many metallic oxides, and the earths. It forms the basis of rock-salt, and sea-salt; is obtained from the ashes of marine plants, and exists in some minerals.

194. *Chloride of sodium* (muriate of soda) consists of one proportion of sodium and two of chlorine. It is a non conductor of electricity. It fuses in a strong red heat, and volatilizes in a white heat. It crystallizes in cubes. It is decomposed by potassium, which attracts its chlorine.

195. Sodium readily forms sulphurets and phosphurets which are less inflammable than those of potassium.

196. Potassium and sodium combine readily in various proportions. A small quantity of potassium renders sodium brittle and very soft. A small quantity of sodium renders potassium fluid at a common temperature, and reduces its specific gravity considerably.

197. *Barium*, the base of barytes, a dark grey-coloured solid; lustre less than cast-iron, heavier than sulphuric acid, decomposes water, and is oxygenized by exposure to the air.

198. *Barytes* is obtained in small, grey, porous masses of tolerable solidity; its taste is acrid, urinous and pungent; applied to the skin, it proves caustic, and it is deleterious when swallowed; its specific gravity is 4; it is soluble in twenty times its weight of cold water, and in twice its weight of boiling water; depositing, on cooling, transparent, white, prismatic crystals; when slaked, it boils up with violence, becomes very hot, increases in bulk, and is changed into a spongy white mass. It changes vegetable blues to green; it is fusible; and combines with all the acids, sulphur, sulphuretted hydrogen, and phosphorus. It is the basis of some of the heavy spars.

199. *Strontites* is obtained in small, whitish-grey, and often porous masses; its taste is warm, acrid, and urinous; it is slightly caustic, acting feebly on animal matters. Taken into the stomach, it is not poisonous; its specific gravity is nearly 4; it is soluble in 200 times its weight of water at 50°, but in little more than six times its weight of boiling water, which, on cooling, deposites flat rhomboidal crystals; it is slaked more rapidly than lime, and it is infusible; it changes vegetable blues to green; it combines with all the acids, sulphur, sulphuretted hydrogen, and phosphorus, alumina, and silex. It is the basis of some of the heavy spars.

200. *Calcium*, the base of lime, is brighter and whiter than barium or strontium.

201. Lime is of a grey-white colour, warm, acrid and urinous to the taste; sp. gr. 2.33, soluble in 450 times its weight of water. It is apyrous; it changes vegetable blues to green; it combines with all the acids, sulphur, sulphuretted hydrogen, and phosphorus; it is very abundant in the mineral kingdom, and forms the basis of animal bones and shells. The calcareous spars, marble, limestone, chalk and marl, consist chiefly of lime. *Officinal.*

202. Hydrat of lime. When a small quantity of water is thrown upon fresh burnt lime, it is absorbed rapidly, with the extrication of considerable heat, and some phosphorescent light; at the same time the lime crumbles down into a very fine, white, dry powder, augmented much in bulk, but less caustic than before. Lime, thus slaked, does not renew these phenomena, on a farther addition of water, but may be diffused or dissolved in it.

203. *Phosphuret of lime* is insoluble in water, but they decompose each other, producing phosphuretted hydrogen gas, which arises in bubbles to the surface of the water, where they explode with a clear flame. Phosphuret of baryta is a brown mass; of a metallic appearance; very fusible; luminous in

the dark; decomposed by exposure to air; emitting an alliaceous smell when moistened; and decomposed by water, furnishing phosphuretted hydrogen gas. The phosphuret of strontia is very similar.

204. *Magnesium*, the base of magnesia, only obtained as a dark grey metallic film; less fusible than plate glass, burning with a red light when strongly heated, and decomposing water slowly.

205. *Magnesia* is obtained in light, white, friable masses, or very fine powder; to the touch it is very fine; its taste is not very sensible, but peculiar and pleasant; its specific gravity is 2.33. It is insoluble in water, but forms with it a paste without ductility. It is apyrous; slightly alters vegetable blues to green; forms soluble compounds with most acids, and unites with sulphur. The fossils in which it predominates are generally soft, and have an unctuous feel. The principal are talc, steatites, asbestos, &c.

206. Hydrat of magnesia is the state in which it is obtained by precipitation, from its solution in an acid, by potass or soda.

207. *Alumina* is obtained in friable fragments, or in a very fine white powder; soft and unctuous to the touch; adhering strongly to the tongue, absorbing its moisture, and producing a slightly styptic effect upon it; specific gravity 2; insoluble in water, but very diffusible through it; absorbing a certain quantity of it rapidly, and forming with it a very ductile adhesive paste, which contracts and hardens remarkably in the fire, but is perfectly infusible. Its ultimate particles seem to be opaque. It combines with most of the acids, and these compounds have a sweetish styptic taste; it unites with charcoal, the alkalies, baryta, strontia, lime and silica; it is manufactured into porcelain and glass. Fossils, containing much alumina, have generally a laminated structure; it exists crystallized in sapphire; and it forms the basis of all clays, boles, mica, trap, basalts, slate, and corundum.

208. Glucinum; scarcely known.

209. *Glucina* is obtained in white light masses or powder, of a soft feel, insipid, but adhering strongly to the tongue; apyrous; and soluble in water, but forming with it a paste, slightly ductile and adhesive; it is soluble in potass, soda, and carbonate of ammonia; it combines with most of the acids, forming soluble salts, difficultly crystallizable, of a sweet and somewhat astringent taste, and with sulphuretted hydrogen. It has hitherto been found very sparingly only in the beryl and emerald.

210. *Thorinum*, Never examined.

211. *Thorina*, white, soluble in muriatic acid; neutral salts astringent.

212. *Zirconum*, the basis of zircona; properties little known.

213. *Zircona* is obtained in the form of a harsh whitish powder; without taste or smell; having a specific gravity of 4.3; insoluble in water; softened by the heat of a smith's forge; but when surrounded by charcoal, its particles become agglutinated, and so hard as to strike fire with steel; soluble in all the acids; fusible with silex and alumina; insoluble in the alkalies, but soluble in their carbonates. It is only found in the zircon or jargon of Ceylon, and in different varieties of hyacinth.

214. *Hydrat of zircona* has the appearance of a resin or glue. It contains more than 20 *per cent.* water, which may be expelled by heat.

215. *Silicum*, the basis of silica; properties not ascertained.

216. *Silica*, when obtained perfectly pure by art, is in the form of a very fine white powder, hard, rough, and gritty, to the touch; when applied to the tongue, giving a rough and dry sensation, but without taste or smell, having a specific gravity of 2.66; in the state of hydrat, soluble in 1000 times its weight of water; soluble in the fixed alkalies and fluoric acid; fusible with the fixed alkalies and other earths; and combining, by fusion, with the metallic oxides, and the phosphoric and boracic acids. It has a tendency to crystallization, and its ultimate particles seem to be transparent. It in general imparts to the fossils, of which it is a principal constituent, transparency, lustre, a tendency to crystallization, and a degree of hardness, enabling them to strike fire with steel. Rock crystal, quartz, agate, flint, chalcedony, jasper, shorl, are examples of siliceous stones.

217. *Ittrium*, the basis of ittria, not ascertained.

218. *Ittria* is obtained in the form of a fine white powder, without taste or smell; insoluble in water; it does not alter vegetable blues; is infusible; insoluble in the alkalies, but readily soluble in the carbonate of ammonia. With the acids it forms salts, which have a sweet and somewhat austere taste. It has been found only in the Gadolinite.

OXIDIZABLE METALS.

219. *Manganesum.* Small whitish grey globules; specific gravity 6.850; very hard and very brittle; very difficult of fusion; very oxidizable by exposure to air; decomposes water rapidly; is oxidized by the sulphuric and nitric acids;

burns when strongly heated in oxygen or chlorine; combines with many metals. According to Berzelius, it forms five oxides, containing 1, 2, 4, 6, and 8 proportions of oxygen, to one of metal. These oxides colour glass brown, violet, or red, and destroy the colour of glass coloured by iron.

220. *Zinc* is bluish white, lamellated, sapid, and odorous; specific gravity 7.190; soft, clogging the file; above 212° malleable and ductile; fusible at 700°; vaporizable; a powerful agent in the phenomena of galvanism; oxidized by fusion; at a red heat it catches fire, and emits white films of oxide; it easily decomposes water; it is oxidized and dissolved by almost all the acids. *Officinal.*

221. *Tin* is pure brilliant-white, sapid and odorous; specific gravity 7.291 to 7.500; soft, flexible, and emitting a crackling noise when bent; very malleable; fusing at 442° Fahrenheit; oxidizes slowly in the air; is converted, when fused, into a grey oxide; when red hot it burns vividly. Sulphuret and phosphuret are lamellated and brittle; it forms alloys with arsenic, bismuth, antimony, mercury, and zinc; it is oxidized by many acids, and combines with the fluoric, boracic, and carbonic acids. *Officinal.*

222. *Iron* is of a bluish-grey colour; texture either fine grained, fibrous, or dense plates; sapid and odorous; specific gravity 7.600; the hardest, most elastic, and most tenacious metal; very ductile; fusing at 158°. Wedgwood, fusion at first clammy, afterwards very fluid; igniting by strong percussion, and inflaming by the collision of flint; magnetic. It is oxidized slowly in the air, especially when moist; when heated in contact with air, it is oxidized; deutoxide, black, fusible, hard, brittle, lamellated, still attracted by the magnet; tritoxide, fine, pulverulent, not attracted by the magnet, containing 0.40 to 0.49 of oxygen. It burns with splendour and deflagration in oxygen gas, and is converted into a fused black oxide; it decomposes water slowly, and when ignited, very rapidly. Iron is oxidized and dissolved by almost all the acids. It gives glasses a brown, smoky, deep green, or black colour. Carbon united to iron converts it into steel. *Officinal.*

223. *Steel* is of a grey colour, brilliant and granular in its fracture; specific gravity 7.795; harder than any of the metals, and more elastic, ductile, malleable, and fusible at a lower temperature than pure iron. Its characteristic property is, that after being heated, if suddenly plunged into cold water, it becomes harder, more elastic, less pliable, and brittle; but by being again heated and cooled slowly, it acquires its former softness, pliability, and ductility. Steel contains only

some hundredth parts of carbon, and is known chemically by letting a drop of acid fall upon it, which produces a grey or black spot. *Plumbago* consists of about 0.1 of iron, combined with carbon.

224. *Lead* is of a grey blue livid colour, streak grey, disagreeable taste and odour; specific gravity 11.352; soft; very laminable; hardens little under the hammer; very flexible; not very ductile; slightly tenacious; fusible at 612° Fahrenheit; volatile at a red heat; tarnished in the air; slightly oxidized by air and water; burns when strongly ignited, and in oxygen with a brilliant white flame. When heated in chlorine it unites with it, but it does not inflame. Its phosphuret and sulphuret are brittle; and it is oxidized by, and combines with, the sulphuric, nitric, phosphoric, and other acids. Its oxide imparts to glass a uniform density, and strong refracting power. *Officinal.*

225. *Antimony.* White, very brilliant, lamellated; specific gravity 6.702; moderately hard; pulverizable; fusible at 809; volatile when highly ignited; sensible taste and smell; unalterable in cold air; oxidizable by air and heat; oxide fusible into a yellow-brown glass; decomposes water when ignited; oxidized by the sulphuric and nitric acids; combines with phosphorus and sulphur. Oxides colour glass yellow and hyacinthine. *Officinal.*

226. *Bismuth.* White, slightly yellow, in large specular plates; pulverizable; specific gravity 9.822; moderately hard; sensible odour and taste, fusible at 460°, and volatile at a high temperature; oxidizable by heat and air; oxide vitrifiable into a greenish-yellow glass; oxidizable by boiling sulphuric, nitric, and muriatic acids; unites with sulphur. Oxide yellow, and colours glass of a greenish-yellow.

227. *Tellurium.* White, lead-grey, very bright, harsh and brittle; lamellated; crystallizable; specific gravity 6.115; very fusible and volatile; burns with a blue and greenish flame, and a white smoke, having the odour of radishes; oxide very fusible into a straw-coloured radiated glass; soluble in sulphuric, nitric, and nitro-muriatic acids; unites with sulphur. Oxides black, white.

228. *Cobalt.* Reddish-grey, fine grained, pulverizable; specific gravity between 7.770 and 7.800; very difficult of fusion, oxidizable before fusion; unalterable by water; acted on by all the acids; combines with phosphorus and sulphur; its alloys are granulated, rigid, and brittle. Oxides deep blue and black, and colour glasses of a fine blue.

229. *Copper.* Bright red; disagreeable taste and smell when rubbed or heated; specific gravity 7.79; ductile; of

great tenacity; sonorous; fusible at 27° Wedgwood; granulated texture, and subject to blisters; a good conductor of caloric, electricity, and galvanism; becomes brown, and at last green in the air; when heated turns blue, yellow, violet, deep brown; when ignited and plunged into water, forms brown, brittle scales of oxide. Its phosphuret is brilliant, brittle, hard, and fusible; its sulphuret brown, fusible, and very phosphoric; its alloy with arsenic is white, with bismuth reddish, with antimony violet, with mercury deep red, with zinc forms brass, and with tin is orange; it is oxidized and dissolved by the sulphuric, nitric, and muriatic acids; its oxide is brown, brittle, and soluble in ammonia, acquiring a beautiful blue colour. *Officinal.*

230. *Nickel.* Colour between those of platinum and steel; undergoing changes of colour by the action of fire similar to those of steel; specific gravity nearly 9; malleable and ductile; magnetic; very difficult of fusion, and of oxidization in the air; oxidizable by most of the acids, which it colours of a brilliant green; combines with phosphorus, sulphur, and the metals. Oxide grey, colouring glass brown, orange, red.

231. *Uranium.* An incoherent mass of small agglutinated globules, of a deep grey and pale brown; specific gravity 8.1; very hard; very difficult of fusion, even by long continued heat; is acted upon by several of the acids; combines with phosphorus. Oxides soluble in the alkalies, and very soluble in their carbonates. Oxides black, yellow, colouring glass of a greenish-yellow, emerald green, or brown.

232. *Osmium.* Dark grey or blue; infusible when excluded from the air; insoluble in all acids; oxide forms a yellow solution with potash, and is extremely volatile, smelling like oxymuriatic acid.

233. *Titanium.* Agglutinated, hard, friable masses, crystallized internally of a brilliant red; infusible; unalterable by water; oxidizable by boiling sulphuric, nitric, and muriatic acids. Oxides blue, deep red, white.

234. *Cerium.* Oxides white and brown; the former most readily soluble in nitric, and the latter in muriatic and sulphuric acids.

235. *Palladium.* Dull white, malleable, ductile, fusible, specific gravity 11.5; hard; forms a red solution with nitro-muriatic acid; affording an orange precipitate with alkalies and earths; and olive-coloured with prussiate of potass.

236. *Iridium.* White; very heavy; infusible; insoluble in acids, unless when previously combined with an alkali; muriatic and sulphuric solutions, green and blue; nitric, red.

The former give a green precipitate, soluble in excess of alkali: the latter a red, insoluble.

237. *Rhodium.* White, infusible; specific gravity 11; unites with other metals readily, except mercury. Soluble in all acids. Muriate of rhodium rose-coloured; soluble in alcohol; not precipitated by prussiate of potass, muriate, or hydrosulphuret, or alkaline carbonates of ammonia; but by alkalies in the form of a yellow oxide.

238. *Mercury.* Very bright white; specific gravity 13.568; freezing at —39°; boiling at 660°; when frozen, ductile and malleable; oxidizable by trituration in the air, and in a farther degree by the action of the air and heat; does not decompose water; forms amalgams with many metals; and is oxidized and dissolved by the sulphuric, nitric and oxymuriatic acids. Oxides black, red. *Officinal.*

239. *Silver.* Very brilliant white, insipid, inodorous; specific gravity 10.474 to 11.091; hardness between iron and gold; elasticity between gold and copper; strong acute sound; considerable ductility and tenacity; hardening much under the hammer; a good conductor of electricity, caloric, and galvanism; fusible at 28° Wedgwood; crystallizable by cooling; unalterable in the air; changed into a greenish oxide by long and violent heat, burning with a greenish flame; and instantly by the electric shock. Its phosphuret is granulated, brittle, and fusible; its sulphuret grey, black, lamellated, or striated, and fusible; it unites but slightly with the acidifiable metals and iron; is hardened by gold, bismuth, antimony, tin, lead, and copper, and amalgamates with mercury. It is oxidized and dissolved by the sulphuric, sulphurous, and nitric acids, and combines with chlorine. Its oxide is olive; reducible by the other metals, hydrogen, and light and heat; colours some glasses of an olive green, and is very soluble in ammonia. *Officinal.*

240. *Gold* is of a brilliant yellow colour, insipid, and inodorous; specific gravity between 19.258 and 19.300; soft and flexible; little elasticity or sonorousness; so ductile, that its surface may be extended more than 650,000 times; of very great tenacity; easily hammer hardened; a good conductor of caloric, electricity, and galvanism; fusing at 32° of Wedgwood; brittle when cooled too quickly; crystallizing in octohedrons; unalterable in the air; converted by a long and violent heat into a vitrified violet oxide; oxidized and dispersed by electricity; soluble in alkaline sulphurets; rendered brittle by phosphorus, arsenic, bismuth, tin, and antimony; less brittle by lead; soluble in mercury; hardened by zinc, copper, iron, steel, and silver; oxidizable, of a purple colour, and

slightly soluble in nitrous acid; readily oxidized and dissolved by nitro-muriatic acid. Its oxide is easily reduced by light and heat, colours glasses purple or topaz yellow, and forms a fulminating compound with ammonia.

241. *Platinum.* Of a grey white colour, almost black when polished, insipid, inodorous; specific gravity 20.850 to 21.061; softer only than iron, and less ductile only than gold; most difficult of fusion, above 160° of Wedgwood; a good conductor of electricity and galvanism; unalterable by air and heat; converted into a grey powder, its first degree of oxidation, by electricity; unites with phosphorus; forms alloys with arsenic, bismuth, antimony, mercury, zinc, tin, lead, cast iron, copper, silver and gold. It is oxidized and dissolved by the oxymuriatic acid, and more readily by the nitromuriatic. Oxide grey.

### ACIDIFIABLE METALS.

242. *Tungsten.* Small slightly adherent globules of a slate grey; specific gravity 17.5; very infusible; oxidizable in the air by heat, and afterwards acidifiable. Oxide yellow, pulverulent, colouring glass of a blue or brown colour; and a white harsh powder; specific gravity 6.12.

243. *Columbium* or *Tantalium* has hitherto been examined only in the state of oxide or acid, which is a white powder insoluble in water, nearly insoluble in sulphuric, nitric, or muriatic acids, but soluble in citric, tartaric, and oxalic acid; soluble in water when fused with potass or soda; solution not precipitated by prussiate or hydrosulphuret of potass, but precipitated orange by infusion of galls.

244. *Arsenic.* Grey plates of a lively brightness; friable specific gravity between 8.310 and 5.073; vaporizable at 540°; emitting a smell like garlic; crystallizable; oxidizable in the cold air; inflammable at a red heat, and sublimed in the form of the white oxide or acid; farther oxidizable by the nitric and nitrous acids; combines with phosphorus, sulphur, and many of the metals; soluble in hydrogen gas. *Officinal.*

245. *Molybdenum.* In black powder, or agglutinated, blackish, friable masses, having little metallic brilliancy; specific gravity 8.611; by a strong heat changes into a white brilliant oxide in needles, and very acidifiable: oxidizable by boiling sulphuric acid, and acidifiable by the nitric acid. It forms a sulphuret; and its alloys are granulated and friable; acid white, pulverulent, styptic; specific gravity 8.400.

246. *Chromum.* Agglutinated masses of a whitish-grey colour; very hard, very brittle, and very infusible; appears to

be difficult to oxidize, and easy to disoxidize; does not appear to decompose water; not attacked by the sulphuric or muriatic acids; changed into a green oxide, and afterwards into a red acid, by the nitric acid distilled from it. Oxide of a beautiful emerald green; acid red, and, combined with lead, rich orange-yellow.

### COMPOUND OXIDES, ACIDS AND ALKALIES.

247. We have already noticed all the binary combinations which oxygenizable substances form with oxygen. These in general have considerable permanence in their characters, and admit of few variations in the proportions of their constituent principles. But oxygen is capable of entering into combination at the same time with more than one simple substance, forming oxides and acids with double or triple bases, which, in consequence of the increased number of principles, are subject to greater variations in their proportions, and are less permanent in their characters. These are, however, the substances with which pharmacy is chiefly occupied, as they comprehend almost the whole of the vegetable and animal kingdoms. Chemists, borrowing their arrangement from natural history, have almost always considered them under the title of Vegetable and of Animal Substances. But such an arrangement is so totally unconnected with the principles of chemistry, that the imperfect state of our knowledge is the only apology that can be offered for its continuance; and limited as that knowledge is, we are persuaded that an attempt at a classification of these bodies, on chemical principles, is to be preferred.

### COMPOUND OXIDES.

248. The compound oxides are characterized by their great alterability, and by their affording, when burnt with a sufficient quantity of oxygen, both water and carbonic acid. They may be divided into

*a.* Ternary oxides, containing various proportions of carbon, hydrogen, and oxygen;
*b.* Quaternary oxides, consisting of nitrogen, carbon, hydrogen, and oxygen.

249. The ternary oxides coincide nearly with the class of vegetable substances; and are characterized,

*a.* By their being converted entirely into water and carbonic acid gas, when completely decomposed by oxygen;

*b*. By their undergoing the acid fermentation, from the action of air and water;

*c*. And by their furnishing nitrous gas and carbonic acid, when treated with nitric acid.

250. The quaternary oxides coincide nearly with animal substances, and are characterized.

*a*. By their furnishing, when decomposed by oxygen, ammonia as well as water and carbonic acid gas;

*b*. By their becoming putrid from the action of air and water;

*c*. By their furnishing nitrogen gas when treated with nitric acid.

*d*. And by their furnishing ammonia when triturated with potass.

TERNARY OXIDES.

251. *Alcohol* is a transparent colourless liquid, of an agreeable penetrating smell, and pungent burning taste: specific gravity 0.8. It remains fluid in the greatest natural or artificial cold. It boils at 176°, and in vacuum at 56°. Alcohol unites with water in every proportion. During the combination, caloric is evolved, and the specific gravity of the compound is greater than the mean of those of the components. Alcohol dissolves about 60 of sulphur, when they are presented to each other in a state of vapour. It also dissolves a little phosphorous. These solutions are decomposed by water. It dissolves the boracic and carbonic acids, ammonia, soda, and potass, and is the means employed to obtain the two last in a state of purity. Its action on the salts is various. It dissolves the volatile oils, resins, soaps, balsams, camphor, sugar, tannin, cinchonin, extractive, and in part the gummy resins. Alcohol is very inflammable, and when kindled burns entirely away, with a blue flame without smoke. The products of its combustion are carbonic acid and water. It is also decomposed by being transmitted in the state of vapour through a red-hot porcelain tube; by being heated with the fixed alkalies; and by the action of the sulphuric, nitric, and acetic acids, and of chlorine. *Officinal.*

252. *Sulphuric ether* is a transparent colourless fluid, of a very fragrant odour, and hot pungent taste: specific gravity 0.758. It freezes and crystallizes at —46°. It boils at 98°, and in vacuum at —20°. It is very soluble in air, and during its evaporation it produces an intense degree of cold. It is soluble in ten parts of water, and in alcohol in every proportion. It dissolves a small portion of phosphorus, and the solution is

decomposed by alcohol. It absorbs nitrous gas, combines with ammonia, and dissolves the volatile oils, resins, and caoutchouc. Ether is extremely inflammable, and burns with a white flame. Its vapour explodes when kindled in contact with oxygen gas. It is decomposed by sulphuric acid, chlorine, and by being transmitted through a red-hot porcelain tube. Its constituents are oxygen, carbon, and hydrogen; the proportions not ascertained. *Officinal.*

253. An ether perfectly similar to the sulphuric may be prepared by means of the phosphoric or arsenic acids. Into the composition of these ethers, none of the acid enters.

254. *Muriatic ether, nitrous ether, and hydriodic ether,* agree in being more volatile than alcohol, but each of them derives peculiar properties from the acid which enters into their composition as an essential constituent.

255. *Acetic ether, benzoic ether, oxalic ether, nitric ether, malic ether, and tartaric ether,* agree in being less volatile than alcohol, and differ like the preceding from the presence of their respective acids.

256. *Pyroacetic spirit* is procured in greatest purity by distilling acetate of barytes. It is a white, limpid fluid, taste at first acrid, afterwards cooling, smell resembling a mixture of peppermint and bitter almonds: specific gravity 0.7864, inflammable, boils at 165°. It mixes readily with water, alcohol and volatile oil, and hot olive oil. It dissolves camphor, and, when hot, wax and tallow, and a little sulphur and phosphorus. It dissolves potass, becoming darker coloured. It is changed by sulphuric acid, and is decomposed by nitric. It enters into combination with muriatic acid, forming with it a peculiar compound. It is contained in vinegar.

257. *Fixed Oils* are transparent, more or less coloured, somewhat viscid, inodorous fluids, having a mild taste and unctuous feel. In the different species the specific gravity varies from 0.9403 to 0.9153. The point of congelation also differs considerably, but in general it is within the range of the ordinary temperatures of the atmosphere. Their boiling point exceeds 600°; and by being converted into vapour, they become empyreumatic. Fixed oils do not seem capable of combining with charcoal, but are freed from impurities by being filtered through hot charcoal. When assisted by heat, they dissolve sulphur and phosphorus. They may be blended with sugar and gum by trituration, as in emulsions, and they dissolve the volatile oils, resins, and gummy resins. With the alkalies and earths they form soaps, and with metallic oxides plasters. They are not soluble in water, but have various habitudes in regard to alcohol. They unite readily with

oxygen, which renders them concrescible. Those oils which dry without losing their transparency, as linseed oil, are termed drying oils, in contradistinction to the fat oils, which from exposure become white, opaque and thick, and remain greasy, such as oil of olives or of almonds. When they become rancid, they undergo a further degree of decomposition, and are found to contain sebacic acid. Oil in the state of vapour is inflammable, and burns with a white flame. When the combustion is complete, the products are carbonic acid gas and water, but in general soot is also deposited. The sulphuric acid renders the fixed oils brown and thick, and converts them into water and charcoal. The nitric acid oxygenizes them. The oxygenized muriatic acid or chlorine blanches them, and renders them concrete, like tallow or wax. The oils oxidize several of the metals, and are oxidized by several of their oxides. *Officinal:* Oil of almonds, linseed, mustard, castor oil, and cocoa butter.

258. *Animal fats* possess many properties in common with the fixed oils, and differ chiefly in their being congealed and opaque at the temperature of the atmosphere. They differ considerably in fluidity, from the semifluid ducks' grease to the solid mutton suet. All these fats as well as the fixed oils have been lately ascertained by M. Chevrueil and Braconot to consist of two substances, Stearin and Elain, combined in different proportions.

259. *Stearin* is crystallizable, white and brittle, with little smell or taste. It melts at from 109° to 120°, is soluble in alcohol. It is altered by the action of alkalies, and forms with them soap.

260. *Elain* is the fluid constituent of oil and fat, remaining liquid at 59°. It is seldom pure or free from colour and taste.

261. *Wax* is a solid of considerable consistence, granulated and crystalline in its fracture, of a white colour, and without any remarkable odour or taste. It softens and becomes plastic when very slightly heated; at 142° it melts; at a higher temperature it is in part vaporized and decomposed, and its vapour is inflammable. It resists in a remarkable degree the action of the acids; but in most of its other properties it resembles the fixed oils. *Officinal.*

62. *Spermaceti* may be obtained crystallized in white argentine plates, of an unctuous feel and taste, and a vapid smell. It melts between 90° and 95°, and at a higher temperature may be sublimed almost unchanged. Its vapour is inflammable, and its flame is bright, clear, and without smell. By exposure to the air it becomes rancid. It is soluble, es-

pecially by the assistance of heat, in alcohol and in ether. In its other properties it agrees with the fixed oils, with which it unites very readily by fusion. Muscular flesh, by long maceration in water, is converted into a substance very analogous to spermaceti, but more fusible, melting at 82°; and biliary calculi often consist of another, which is much less fusible, requiring a heat of 192° for its fusion. For all these varieties, Fourcroy has proposed the generic name *Adipocire.* *Officinal:* Spermaceti.

263. *Soaps* are combinations of the fluid or concrete fixed oils with alkalies, earths, or metallic oxides. The alkaline soaps have an unpleasant taste and peculiar smell, form a milky solution with water, and a transparent one with alcohol, and are powerfully detergent. White soap is made of soda and olive oil or tallow. Brown soap contains also resin. Soft soap consists of potass and whale oil: the white spots in it are from the addition of a little tallow. The volatile liniment of the pharmacopœias is a soap of ammonia and olive oil. The alkaline soaps are decomposed by all the earthy salts. The alkali of the soap combines with the acid of the salts, and an earthy soap is formed from the union of the earth and oil. The earthy soaps are insoluble in water. The alkaline soaps are decomposed in the same way by the metallic salts. The metallic soaps are also insoluble in water; many of them are soluble in oil, and some of them in alcohol. *Officinal:* Soaps of soda and ammonia.

264. *Plasters* are also combinations of oil with metallic oxides. They are prepared by their immediate action on each other. Olive oil and litharge are most commonly employed. *Officinal:* Litharge plaster.

265. *Volatile oils* differ from the fixed oils most remarkably in being vaporized unchanged by heat under 212°; by evaporating completely, without leaving a stain on paper; by being sapid, often pungent and odorous; and by being soluble in alcohol, and to a certain degree in water. They are more inflammable than the fixed oils, and burn with a large white flame, emit a great deal of smoke, and require more oxygen for their combustion. By exposure to the air they become coloured and thick, and are at last converted into an almost inodorous resin. They are also oxidized and converted into resins by muriate of mercury and muriate of antimony; the acids act on them with great violence, and are even capable of inflaming them. On the other hand, they resist considerably the action of the alkalies. In their other general properties they agree with the fixed oils, from which they seem to differ in composition, only in containing a larger proportion

of hydrogen. In other respects, these oils are infinitely varied, especially in their taste and odour. Some are as limpid as water, others are viscid, others congeal on a slight diminution of temperature, and are even naturally concrete, and others are capable of forming crystallizations. Their predominant colours are the different shades of yellow and red, but there are also blue, green and glaucous essential oils. Their specific gravity varies from 0.8697 to 1.0439. *Officinal:* Oil of anise, cajeput, caraway, fennel, juniper, lavender, mace, origanum, pennyroyal, peppermint, pimento, rosemary, rue, sassafras, savine, spearmint, turpentine, cloves, and all aromatic or odorous substances. *Empyreumatic oils:* Oil of amber, of hartshorn, of petroleum.

266. *Resins* are concrete substances, possessing a certain degree of transparency, and generally of an amber or brownish red colour. Their texture is homogeneous, and their fracture vitreous. They are easily reduced to powder, which readily agglutinates. Their specific gravity varies from 1.0452 to 1.2289. They have little taste or smell. They are electrics. Exposed to a certain degree of heat, they melt without suffering alteration, but they are decomposed when converted into vapour. Their vapour is inflammable, and burns with a large strong flame and a great deal of soot. Resins unite by fusion with sulphur, difficultly with phosphorus. They are soluble in alcohol, the fixed and the volatile oils, and alkalies, and in nitric acid with evolution of nitric oxide gas. They are insoluble in water, and are not acted upon by metallic oxides. *Officinal:* Pine resin, dragon's blood, balsams of Peru, Tolu, Gilead and Canada, turpentine, benzoin, storax, olibanum, tacamahac, mastiche, sandarac, elemi.

267. *Guaiac* differs from the resins in being soluble in nitric acid without the assistance of heat, and forming oxalic acid instead of tannin; in nitric and oxymuriatic acid, changing the colour of its solutions to green, blue, and brown, successively, and in affording a larger quantity of charcoal. *Off.*

268. *Lac* differs from resin in not being soluble in alcohol without the aid of a boiling temperature, and in being precipitated from it as it cools. Vauquelin analyzed a gum resin from Madagascar, which contained both resin and lac in the proportions of 84 to 6.

269. *Amber*, *copal*, and about one-fifth of *sandarac*, differ from the resins in not being soluble in alcohol without peculiar management.

270. *Camphor* is a concrete friable substance, of a white colour, with a considerable degree of transparency, and a crystalline appearance, specific gravity 0.9887. Its taste is bit-

ter and acrid, and its smell penetrating and peculiar. It is evaporated unchanged by a heat of 145°, but may be melted by suddenly exposing it to 302°. The vapour when condensed crystallizes in hexagonal plates. Its vapour is exceedingly inflammable, and when kindled, burns with a very white flame and a great deal of smoke, leaving no residuum. The products of its combustion are carbonic acid gas, charcoal, and water. Camphor is soluble in alcohol and in the acids. From these solutions it is precipitated by water. It is also soluble in hot oils, both volatile and fixed, but on cooling separates from them in plumose crystals. It is insoluble in water, and is not acted on by the alkalies, metals, or metallic oxides. By repeated distillation with nitric acid it is converted into camphoric acid. It exists in many vegetables, but is chiefly procured from the *laurus camphora*. *Officinal.*

271. *Starch* is a fine white powder, generally concreted in friable hexagonal columns, smooth to the feel, and emitting a particular sound when compressed. It has neither taste nor smell. It is decomposed by heat. It is not soluble in cold water or in alcohol. Warm water about 190 F. converts it into a kind of mucilage, which on cooling assumes a gelatinous consistence. This jelly, when dried by heat, becomes transparent and brittle like gum, but is not soluble in cold water. Starch, after being thus dissolved in hot water, cannot be reduced to its original state. It is precipitated by infusion of galls, and the precipitate is redissolved on heating the mixture to 120°, but is not soluble in alcohol. At 78 F. its watery solution ferments on the addition of yeast. By roasting it becomes soluble in cold water. Is converted by three or four hours boiling with sulphuric acid into a saccharine liquid. *Officinal:* Wheat, starch, flour, barley, oats.

272. *Asparagin* crystallizes in white, transparent, hard, brittle, rhomboidal prisms; taste cool and nauseous; readily soluble in hot water, sparingly in cold, and insoluble in alcohol. Solution does not affect vegetable blues, infusion of nutgalls, acetate of lead, oxalate of ammonia, muriate of barytes, or hydrosulphuret of potass. Potass disengages no ammonia, but renders it more soluble in water. It dissolves in nitric acid, forming a solution of a yellow colour and bitter taste. It has hitherto been found only in the expressed juice of asparagus.

273. *Inulin* is a white powder, insoluble in cold, but readily soluble in hot water; insoluble in alcohol; burns with the smell of caromel, and yields oxalic acid, when treated with nitric acid.

274. *Sugar* is a hard but brittle substance, of a white colour, disposed to form semi-transparent crystallizations, of a

sweet taste, and without smell. When heated sufficiently it melts, is decomposed, emits a peculiar smell (caromel), and becomes inflamed. Sugar at 40° is soluble in its own weight of water, and in still less at 212°. It is also soluble in about four parts of boiling alcohol. It combines with volatile oils, and renders them miscible with water. It also unites with potass and lime. It is decomposed by the concentrated sulphuric and nitric acids. According to Lavoisier's and Dr Thomson's experiments, it consists of about 64 oxygen, 23 charcoal, and 8 hydrogen. *Officinal:* Sugar, honey, manna.

275. *Sarcocoll* (Dr Thomson) does not crystallize; soluble in water and alcohol. Taste bitter sweet. Soluble in nitric acid, and yields oxalic acid. *Officinal:* Sarcocoll, extract of liquorice.

276. *Jelly* is contained in the juice of acid fruits. It is deposited from them in the form of a soft tremulous mass, almost colourless, and agreeable to the taste. It is scarcely soluble in cold water, but very soluble in hot water; and when the solution cools, it again assumes a gelatinous state. With sugar its combination is well known. By long boiling it loses this property of congealing. When dried, it becomes transparent, hard and brittle, resembling gum. It combines with the alkalies, and is converted by the nitric acid into oxalic acid. *Officinal:* Acidulous fruits.

277. *Tannin*, when completely dried, is a brittle substance, of a black colour, and vitreous fracture; it is soluble in alcohol; it is much more soluble in hot than in cold water. The solution has a dark brown colour, astringent taste, and peculiar smell; it is precipitated by acids, in the form of a viscid fluid, like pitch; it is also precipitated by carbonate of potass in yellow flakes; it forms an insoluble elastic precipitate with gelatin, and dark blue or black precipitates with iron. Mr Hatchett has prepared a species of tannin artificially by the action of nitrous acid on charcoal, and various substances containing charcoal. *Officinal:* Galls, uva ursi, tormentil, rhubarb, sarsaparilla, St Lucie cinchona, swietenia, simarouba, filix mas, kino, catechu, salix.

278. *Emetine*, transparent scales, of a brownish-red colour; scarcely any smell; taste bitter; slightly acrid and not at all nauseous; inalterable in the air; soluble in water and alcohol, but insoluble in ethers; decomposed by the sulphuric and nitric acids, and dissolved by the muriatic and phosphoric acids; precipitated by the gallic acid, by the salts of lead and iodine.

279. *Picrotoxine*, brilliant semitransparent white quadran-

gular prisms, soluble in alcohol and water, solutions of the alkalies in acetic and diluted nitric acids; soluble in oil.

### QUATERNARY OXIDES.

280. *Gum*, when pure, is transparent and colourless, easily reduced to powder, without smell and of a slightly sweetish taste. The solution of gum in water constitutes mucilage; it is thick and adhesive, and soon dries when exposed to the air. Gum is also soluble in the weak acids; but is totally insoluble in alcohol, which even precipitates it from mucilage. When triturated with a small quantity of oil or resin, it renders them miscible with water. Gum is very little disposed to spontaneous decomposition; even mucilage may be kept for many years without change; but it is decomposed by the strong acids. By oxygenizement with nitric acid, it forms successively mucic, malic, and oxalic acid; with oxymuriatic acid it forms citric acid. When exposed to heat, it does not melt, but softens, swells, and becomes charred and incinerated. Its products are carbonic acid, and carburetted hydrogen gas, empyreumatic oil, and a considerable quantity of acetic acid, combined with a little ammonia. *Officinal:* Gum arabic, linseed, quinceseed.

281. *Tragacanth* is opaque and white, difficultly pulverizable, not sweetish, is very sparingly soluble in water, but absorbs a large proportion, and forms a paste. Its solution is adhesive, but cannot be drawn out into threads. It moulds readily, and acquires a fetid smell. It is precipitated by nitrate of mercury. It is insoluble in alcohol; and seems to contain more nitrogen and lime than gum does. *Officinal:* Tragacanth.

282. *Ulmin*, a solid, hard, black substance, with considerable lustre; when reduced to powder, brown; insipid, but readily soluble in the mouth; soluble in a small quantity of water; solution transparent, blackish brown, not mucilaginous or adhesive; insoluble in alcohol or ether; convertible into resin by nitric or oxymuriatic acid. Hitherto examined only by Klaproth, and supposed to be a product of the *ulmus nigra*.

283. *Extractive* is soluble in water, especially when hot, and in alcohol; it is also soluble in the weak acids, but is insoluble in ether. It attracts moisture from the atmosphere; and when dissolved in water, it absorbs oxygen and becomes insoluble in water; it is also altered and precipitated by oxymuriatic acid; it has a strong affinity for alumina, and decomposes several metallic salts. It is found in almost all plants,

but can scarcely be procured separate, so that its characters are not well ascertained. *Officinal:* Saffron, aloes.

284. *Gum-resins*, in strict propriety, should not be noticed here, as they are secondary compounds, and probably vary much in their nature. They seem to be compounds of resin with extractive and essential oil, and perhaps other immediate principles not yet ascertained. *Officinal:* Gum ammoniac, galbanum, scammony, assafœtida, gamboge, myrrh, sagapenum, olibanum.

285. *Bitter principle* (Thomson), intensely bitter, of a yellowish colour, ductile while soft, brittle while dry, not fusible, soluble in alcohol and water, not crystallizable, precipitated by nitrate of silver, acetate of lead. *Officinal:* Quassia, gentian, colocynth, broom, simarouba, dandelion, colomba, marsh, trefoil, lesser centaury, blessed thistle, different species of artemisia, cinchona Jamaicensis.

286. *Narcotic principle*, crystallizable, soluble in about 400 parts of boiling water, in cold water, in 24 parts of boiling alcohol, in hot ether, in all acids, and in hot volatile oils, fusible, not volatile, highly narcotic. *Officinal:* Opium, lactuca, belladona, hyoscyamus, hemlock, stramonium.

287. *Acrid principle*, soluble in alcohol, water, acids, and alkalies, rises in distillation with water and alcohol, not neutralized by alkalies or acids. *Officinal:* Squills, garlic, colchicum, asarum, arum, hellebore, bryony, iris, ranunculus, digitalis, viola, scurvygrass, mustard.

288. *Cinchonin*, not acrid, soluble in alcohol and in water, precipitated by infusion of galls; precipitate soluble in alcohol. *Officinal:* Cinchona officinalis, colomba, angustura, ipecacuan, pepper, opium, capsicum.

289. *Indigo* has a deep blue colour, is slight and friable, without taste or smell, insoluble in water, alcohol, ether, and oils, forming a deep blue solution with sulphuric acid; when precipitated from acids, soluble in alkalies, becoming green. It is obtained from the indigofera tinctoria and isatis tinctoria.

290. *Caoutchouc*, when smoke has not been employed in drying it, is of a white colour, soft, pliable, extremely elastic, and difficultly torn; specific gravity 0.9335; inalterable by exposure to air; insoluble in water, but softened, so that its edges may be made to adhere to each other; insoluble in alcohol; soluble, without alteration, in ether previously agitated with water, and in rectified petroleum; soluble in volatile oils; and fusible by heat, but altered, so that it remains glutinous after evaporation and cooling; inflammable; insoluble in alkalies, and decomposed by the strong acids. It is obtain-

ed principally from Hævea caoutchouc and Jatropha elastica in South America, and the Ficus Indica, Artocarpus integrifolia, and Urceola elastica in the East Indies.

291. *Bird-lime* is a green, gluey, stringy, and tenacious substance, insoluble in water and in cold alcohol; unites readily with the oils, and is soluble in ether, forming a green solution.

292. *Suber* constitutes the epidermis of all vegetables. On the Quercus suber it is thickened by art in a surprising degree, and forms common cork. It is a light elastic substance, very inflammable, burning with a bright white flame, and leaving a very spongy charcoal; it is not soluble in any menstruum; it is decomposed by nitric acid, and is converted into a peculiar acid, and an unctuous substance.

293. *Wood* (lignin?), when separated from all the other matters with which it is combined in vegetables, is a pulverulent, fibrous, or lamellated body, more or less coloured, of considerable weight, without taste or smell, and insoluble in water or alcohol. When exposed to a sufficient heat, it is decomposed without melting or swelling, and is converted into charcoal without any change of form. Its products, by combustion, are carbonic acid and carburetted hydrogen gas, water, empyreumatic oil, and acetic acid. By nitric acid, it is changed into the malic, oxalic, and acetic acids. It forms the skeleton of all vegetables.

294. *Cotton*, a white fibrous substance, without smell or taste, insoluble in water, alcohol, ether, oils, and vegetable acids; soluble in strong alkaline leys, and when assisted by heat, in nitric acid, forming oxalic acid.

295. *Fungine* is more or less white, soft, insipid and little elastic; on distillation it furnishes ammonia; inflammable, and decomposed by nitric acid.

296. *Ferment*, grey white paste, firm and brittle, having a peculiar sourish smell; insoluble in alcohol and in water; exciting the vinous fermentation in syrup, and yielding ammonia on distillation.

297. *Osmazone*, a reddish-brown extract, of an aromatic smell, and a strong taste resembling gravy, easily soluble in water and alcohol, and the solution precipitated by infusion of galls, the nitrate of mercury and acetate and nitrate of lead; it yields ammonia.

298. *Picromel*, resembling turpentine in appearance, heavier than water, without colour, having a nauseous smell and an acrid taste, both sweet and bitter, soluble in water and alcohol; the solutions precipitated by subacetate of lead, nitrate of mercury and salts of iron, but not by infusion of galls or the acetate of lead; it yields little ammonia.

299. *Gelatin*, when exsiccated, is a hard, elastic, semi-transparent substance, resembling horn, having a vitreous fracture: inalterable in the air, soluble in boiling water, and forming with it a gelatinous mass on cooling; it is also soluble, but less readily in cold water. It is soluble in acids, even when much diluted, and also in the alkalies. It is precipitated by tannin, with which it forms a thick, yellow precipitate, soon concreting into an adhesive, elastic mass, readily drying in the air, and forming a brittle substance, of a resinous appearance, resembling over-tanned leather, very soluble in ammonia, and soluble in boiling water. It is also precipitated copiously by carbonate of potass, and by alcohol; both precipitates being soluble in water. The solution of gelatin in water first becomes acid, and afterwards putrid. When decomposed by nitric acid or heat, its products shew that it contains only a small proportion of nitrogen. It is principally contained in the cellular, membranous, and tendinous parts of animals, and forms an important article of nourishment. Glue and isinglass, which are much employed in the arts, are almost pure gelatin. *Officinal:* Isinglass, cornu cervi.

300. *Albumen*, when dried, is a brittle, transparent substance, of a pale yellow colour, and glutinous taste, without smell, readily soluble in cold water, insoluble in boiling water, but softened and rendered opaque and white when thrown into it; insoluble, and retaining its transparency in alcohol; swelling; becoming brown, and decrepitating when suddenly exposed to heat. It generally exists in the form of a viscid, transparent fluid, having little taste or smell, and readily soluble in cold water. When heated to 165°, it coagulates into a white opaque mass, of considerable consistency; it is also coagulated by alcohol and acids, and remarkably by muriate of mercury. Albumen forms with tannin a yellow precipitate, insoluble in water. *Coagulated albumen* is not soluble either in cold or in boiling water. It is soluble, but with decomposition, in the alkalies and alkaline earths. It is also soluble in the acids, greatly diluted, but may be precipitated from them by tannin. When decomposed by nitric acid or heat, it is found to contain more nitrogen than gelatin does. White of egg consists of albumen, combined with a very little soda, sulphur, and phosphate of lime. Albumen also forms a large proportion of the serum of the blood, and is found in the sap of some vegetables. It is highly nutritious. *Officinal:* White of egg.

301. *Fibrin* is of a white colour, without taste or smell, tough and elastic; but when dried, hard and almost brittle. It is not soluble in water or in alcohol. The concentrated

caustic alkalies form with it a kind of fluid viscid soap. It is dissolved even by the weak and diluted acids; but it undergoes some change, by which it acquires the properties of jellying, and being soluble in hot water. By maceration in water, it becomes putrid, and is converted into adipocire. By long boiling in water, it is rendered tough and corneous. When decomposed by heat or nitric acid, it is found to contain a large proportion of nitrogen. It forms the basis of the muscular fibre, and is contained in small quantity in the blood. The gluten of wheat does not seem to differ from it in any important property. It is eminently nutritious.

302. *Urea* is obtained in the form of brilliant micaceous crystals, in groups, forming a mass of a yellowish-white colour, adhering to the vessel containing it; difficult to cut or break; hard and granulated in its centre, gradually becoming soft, and of the consistency of honey on its surface; of a strong, disgusting, alliaceous odour; of an acrid, pungent, disagreeable taste. It is deliquescent; and during its solution in water, it causes a sensible diminution of temperature; it is also soluble in alcohol, especially when assisted by heat. On cooling, the alcoholic solution deposites crystals of pure urea. By the application of heat, it melts, swells rapidly, and at the same time begins to be decomposed, emitting an insupportably fetid odour, and is converted into carbonate of ammonia, and carburetted hydrogen gas. Urea is charred by concentrated sulphuric acid; diluted sulphuric acid, aided by heat, is capable of converting it entirely into acetic acid and ammonia; concentrated nitrous acid decomposes it with rapidity; diluted nitric acid, aided by heat, changes it almost entirely into carbonic acid gas and nitrogen gas; muriatic acid dissolves and preserves it; oxymuriatic acid converts it into ammonia and carbonic acid; potass, aided by heat, converts it into the carbonate and acetate of ammonia. It influences the form of the crystallization of the muriates of ammonia and soda. The solution of urea in water varies in colour from a deep brown to a pale yellow, according to its quantity. With eight parts of water it is perfectly fluid; it scarcely undergoes spontaneous decomposition when pure, but the addition of some albumen occasions it to putrify rapidly. By repeated distillation it is entirely converted into carbonate of ammonia. With nitric acid it forms a pearly crystalline precipitate; it also forms precipitates with the nitrates of lead, mercury, and silver. It is not precipitated by tannin or gallic acid. Urea is only obtained from urine by evaporating the solution of a thick extract of urine in alcohol.

### COMPOUND ACIDS.

303. The compound acids possess the properties of acids in general; but they are distinguished from the acids with simple bases, by their great alterability.

304. The ternary acids coincide nearly with the vegetable acids, and are characterized by their being converted entirely into water and carbonic acid, when completely decomposed by oxygen. They consist of various proportions of carbon, hydrogen, and oxygen.

305. The quaternary acids coincide nearly with the animal acids; and are characterized by their furnishing ammonia, as well as water and carbonic acid, when decomposed.

### TERNARY ACIDS.

306. *Acetic acid* is a transparent and colourless fluid, of an extremely pungent smell and a caustic acid taste, capable of reddening and blistering the skin. It is very volatile, and its vapour is highly inflammable; it combines with water in every proportion; with sugar, mucilage, volatile oils, alcohol; it dissolves boracic acid, and absorbs carbonic acid gas; it is formed by the acidification of sugar, and by the decomposition of some other ternary and quaternary compounds by heat or acids. It is decomposed by the sulphuric and nitric acids, and by heat. In its ordinary state, it has only an acid taste, a pleasant odour, specific gravity 1.0005, congeals and crystallizes at —22°, and is vaporized at 212°. *Officinal.*

307. *Formic acid* is in most respects analogous to acetic acid, but has a peculiar smell, and greater specific gravity, being 1.102 to 1.113.

308. *Oxalic acid* is obtained in prismatic crystals, transparent and colourless, of a very acid taste, soluble in their own weight of water at 212°, and in about two waters at 65°. Boiling alcohol dissolves somewhat more than half its weight, and at an ordinary temperature a little more than one-third. It is soluble in the muriatic and acetic acids. It is decomposed by heat, sulphuric acid, and nitric acid. According to Thomson, it consists of 64 oxygen, 32 carbon, and 4 hydrogen.

309. *Mellitic acid* crystallizes in very fine needles, or small short prisms, of a brownish colour, and a sweetish sour, but afterwards bitterish taste; sparingly soluble in water, and decomposed by heat, but not convertible into oxalic acid by nitric acid.

310. *Tartaric acid* varies in the forms of its crystals; its specific gravity is 1.5962; it is permanent in the air; it is de-

composed by heat; it dissolves readily in water, and the solution, when very weak, is decomposed by the atmosphere; it may be changed by nitric acid into oxalic acid. According to Fourcroy, it consists of 70.5 oxygen, 19.0 carbon, and 10.5 hydrogen. *Officinal:* Exists in tamarinds, grapes, &c.

311. *Pyrotartaric acid*, extremely acid, soluble in water, and crystallizable; melts and sublimes by heat, precipitates nitrate of mercury, but not nitrate of silver or acetate of lead.

312. *Citric acid* crystallizes in rhomboidal prisms, which suffer no change from exposure to the air, and have an exceedingly acid taste. When sufficiently heated, they melt, swell, and emit fumes, and are partly sublimed unchanged, and partly decomposed. Water, at ordinary temperatures, dissolves one half of its weight of these crystals; at 212° twice its weight. The solution undergoes spontaneous decomposition very slowly. Sulphuric acid chars it, and forms vinegar. Nitric acid converts it into oxalic and acetic acids. *Officinal:* Orange and lemon juice, heps, &c.

313. *Malic acid* is a viscid fluid, incapable of crystallization, of a reddish-brown colour, and very acid taste. It exists in the juice of apples, and combined with lime, in that of the common house-leek. It forms precipitates in the solution of the nitrates of mercury, lead, and silver. *Officinal:* Barberry, plumb, sloe, elder, &c.

314. *Gallic acid* crystallizes in brilliant colourless plates, of an acid and somewhat austere taste, and of a peculiar odour when heated. It may be sublimed undecomposed, by a gentle heat. It is not altered by exposure to the air, is soluble in $1\frac{1}{2}$ of water at 212°, and in 12 waters at 60, and in four times its weight of alcohol. It has a strong affinity for metallic oxides, especially those of iron. It precipitates gold, copper, and silver brown, mercury orange, iron black, bismuth yellow, and lead white. *Officinal:* It exists in nutgalls, and in most astringent vegetable substances.

315. *Mucic acid* is a white gritty powder, of a slightly acid taste, soluble in 80 times its weight of boiling water.

316. *Benzoic acid* crystallizes in compressed prisms of a pungent taste and smell. It is fusible, and evaporates by heat, for the most part, without change. It is also inflammable, and burns entirely away. It is permanent in the air. It is very sparingly soluble in cold water; but at 212° it dissolves in about 24 waters. It is also soluble in hot acetic acid. It is soluble, without change, in alcohol, in concentrated sulphuric and nitric acid, and is separated from them by water. *Officinal:* In balsams of Tolu and Peru, benzoin, storax, &c.

317. *Succinic acid* crystallizes in transparent white triangular prisms; may be melted and sublimed, but suffers partial decomposition; more soluble in hot than in cold water: soluble in hot alcohol.

318. *Moroxylic acid* crystallizes in colourless transparent prisms, having the taste of succinic acid, and not altered by exposure to the air; volatile, readily soluble in water and in alcohol.

319. *Camphoric acid* crystallizes in white parallelopipeds of a slightly acid bitter taste, and smell of saffron, efflorescing in the air; sparingly soluble in cold water; more soluble in hot water; soluble in alcohol, the mineral acids, volatile and unctuous oils; melting and subliming by heat.

320. *Suberic acid* is not crystallizable, but is obtained either in the form of thin pellicles, or of a white powder like starch. At 60° it requires 80 times its weight of water for its solution; at 140°, 38; at 212°, only twice its weight. When heated, it melts, and on cooling crystallizes in needles. It may also be sublimed in long needles. It does not precipitate solutions of lime, barytes or strontia or their salts, nor the sulphates of copper and of zinc. It precipitates nitrate of silver, muriate of tin, sulphate of iron, nitrate and acetate of lead, and nitrate of mercury. It is not acted on by nitric acid. It is soluble in alcohol, and in the alkalies, forming with them neutral salts.

321. *Laccic acid* is obtained in the form of a reddish liquor, having a slightly bitter saltish taste, and the smell of new bread, by expression from the white lac of Madras; but on evaporation it assumes the form of acicular crystals. It rises in distillation. It decomposes with effervescence the carbonates of lime and soda It renders the nitrate and muriate of barytes turbid. It assumes a green colour with lime water, and a purplish colour with sulphate of iron; and precipitates sulphuret of lime white, tincture of galls green, acetate of lead reddish, nitrate of mercury whitish, and also tartrate of potash; but this last precipitate is not soluble in potass.

322. *Sebacic acid* has no smell, and a slightly acid taste. It is crystallizable, melts like fat, and is not volatile. It is so soluble in hot water as to become solid on refrigeration. It is also very soluble in alcohol. It precipitates the nitrates of lead, silver, and mercury, and the acetates of lead and mercury. It does not precipitate the waters of lime, baryta, or strontia.

323. *Sorbic acid* was discovered in 1814 by Mr Donovan. In its most concentrated form, it is a deliquescent mass, but is generally liquid, transparent, without colour or smell, in-

crystallizable, and extremely acid. It keeps long; is soluble in water and alcohol; exists in the berries of the mountain ash, also in crab apples.

324. *Cinchonic acid* crystallizes in diverging plates, has a very acid taste, without any bitterness, reddens infusion of turnsole, is decomposed by heat, inalterable in the air, and very soluble in water. Found in several varieties of cinchona bark.

325. *Mellitic acid* crystallizes in radiating slender prisms, has a sweet, acid, bitter taste, is decomposed by heat, little soluble in water, and is not changed by nitric acid.

326. *Fungic acid*, incrystallizable, deliquescent, colourless, very sharp taste. Exists in many fungi.

327. *Meconic acid*, colourless, crystallizable by sublimation in fine needles, precipitates the salts of iron of a cherry red. Found in opium.

328. *Nanceïc acid*, liquid, incrystallizable, almost colourless, and of an intensely acid taste, and decomposed by heat Exists in vegetables which have become acid.

329. *Margaric acid* is solid, and of a pearl white colour, insipid, weak smell like that of white wax, lighter than water, and does not redden tincture of turnsole until it be softened by heat; at 134 Fahr. it melts into a colourless very limpid liquid, which crystallizes on cooling into brilliant crystals of the purest white. It is partly volatilized, and partly decomposed by heat.

330. *Oleïc acid* is a pale yellow fluid, with a rancid smell and taste; sp. gr. 0.898; reddens infusion of litmus; insoluble in water, and very soluble in alcohol; below 43 Fahr. it concretes into white acicular crystals.

331. *Cetic acid* is without taste or smell; melts at about 113 Fahr., insoluble in water, soluble in less than its weight of boiling alcohol; the solution reddens turnsole, and on cooling deposites brilliant lamellar crystals.

332. *Rosacic acid*, solid, of a cinnabar colour, without smell, and almost without taste, reddens infusion of turnsole, deliquescent, very soluble in water and alcohol, and forming soluble salts with the alkalies, precipitating acetate of lead of a rose colour, forming with uric acid a compound scarcely soluble in water, convertible into uric acid by nitric acid, and furnishing no ammonia by destructive distillation.

CYANIC ACIDS.

333. *Hydrocyanic acid or prussic acid* is a colourless fluid, of a strong smell, like that of bitter almonds, and a sweetish pungent taste. It does not redden vegetable blues. It con-

sists of carbon, azote, and hydrogen. It is easily decomposed by light, heat, and chlorine. It does not act upon the metals, but forms coloured, and generally insoluble combinations with their oxides. It is obtained from animal substances by the action of heat, nitric acid, fixed alkalies, and putrefaction. *Officinal:* Bitter almonds, Prunus lauro-cerasus.

334. *Ferrocyanic acid* is composed of the elements of prussic acid and the black oxide of iron. It is of a pale lemon colour, has no smell, and is decomposed by a gentle heat or strong light. It forms directly with alkalies and earths the salts termed triple prussiates.

335. *Sulphocyanic acid* is composed of the elements of prussic acid and sulphur. It is colourless or pinkish, sp. gr. 1.022, smell pungent like strong acetic acid. These two acids were discovered by Mr Porret.

336. *Chlorocyanic acid* is a colourless liquid, having a very pungent smell. It reddens infusion of litmus. It precipitates iron green.

QUATERNARY ACIDS.

337. *Amnic acid* is obtained in white, brilliant, acicular crystals, of an acid taste, reddening the tincture of turnsole, sparingly soluble in cold water, but somewhat more soluble in hot water. It is soluble in alcohol. It is decomposed by heat.

338. *Uric acid*, white hard scales, without smell or taste, almost insoluble in cold, and very sparingly soluble in boiling water, but becoming very soluble when combined with an excess of potass or soda; insoluble in alcohol and inalterable in the air. It is decomposed at a high temperature, and furnishes carbonate of ammonia, and carbonic acid: and by nitric acid and chlorine.

COMPOUND ALKALIES.

336. *Morphine*, solid and colourless, crystallizes in truncated transparent and very beautiful pyramids, easily fusible, and crystallizing on cooling; decomposed by fire, yielding ammonia; inflammable; insoluble in cold, and sparingly soluble in hot water; very soluble in alcohol and ether; its solutions affect the vegetable colours as alkalies do, and it neutralizes acids, forming with them crystallizable salts. It is got from opium.

340. *Strychnine.* It is white, inodorous, and of an insupportable bitterness; crystallizes in four-sided prisms, terminated by four-sided elliptical pyramids, is soluble in alcohol, but

not very soluble in water or ether. It exerts no action on turmeric, gives a green colour to the vegetable blues, and restores the blue to paper which has been reddened by an acid. It dissolves very quickly in acids, saturates them, and forms with them neutral salts, which are more or less crystallizable. Weak nitric acid dissolves without altering it, but a concentrated acid imparts to this substance a blood red colour. When the action is continued, the solution becomes yellow, and leaves a product of oxalic acid. It is got from various species of the genus strychnos.

### CHARACTERS OF SECONDARY SALTS DERIVED FROM THEIR ACIDS.

341. The *nitrites* are characterized by their emitting the nitrous acid in orange fumes, on the addition of sulphuric acid.

342. The *nitrates*, by the action of fire, furnish impure oxygen gas, mixed with nitrogen, and are reduced to their bases. By the action of concentrated sulphuric acid, they emit a white vapour; and they are capable of supporting combustion. *Officinal:* Nitrates of potass and of silver.

343. The *carbonates* always preserve their alkaline properties in some slight degree. They are decomposed by all the acids, forming a brisk effervescence, which is colourless. The carbonates of the metals very much resemble their oxides. *Officinal:* Carbonates of baryta, of lime, of magnesia, of potass, of soda, of ammonia, of zinc, of iron.

344. *Borates* are vitrifiable; and their concentrated solutions afford, when heated with the strong sulphuric acid, brilliant lamellated crystals. *Officinal:* Sub-borate of soda.

345. The *sulphites*, by the action of heat, furnish sulphur, and become sulphates. They are also converted into sulphates, with effervescence and exhalation of sulphurous vapours, by the sulphuric, nitric, muriatic, and other acids, and by exposure to the atmosphere gradually, when dry, and very quickly, when dissolved. *Officinal:* Sulphate of potass with sulphur.

346. The *sulphates* form sulphurets when heated to redness with charcoal, and furnish copious precipitates with solutions of baryta. *Officinal:* Sulphates of baryta, potass, soda, zinc, copper, iron, mercury.

347. The *phosphites* are fusible, and, when heated in close vessels, furnish a little phosphorus, and become phosphates. When heated in the open air, they emit a phosphorescent light, and often flashes of flame, accompanied by a strong smell of garlic, and a thick white vapour, and are converted into phosphates.

348. The *phosphates* are crystallizable, fixed, fusible, vitrifiable and phosphorescent. They are not decomposed by charcoal. They are soluble in nitric acid, without effervescence, and precipitable from that solution by lime water. *Officinal:* Phosphate of soda.

349. The *arsenites* are decomposed by heat, and by all the acids.

350. The *arsenates* are decomposed by charcoal at a high temperature.

351. The *molybdates* are generally colourless and soluble, and are precipitated light brown by prussiate of potass.

352. The *chromates* are of a yellow or orange colour.

353. *Columbate* of potass resembles boracic acid in its appearance.

354. *Acetates* are very soluble in water; are decomposed by heat, by exposure of their solutions to the air, and by the stronger acids. *Officinal:* Acetate of potass, lead, zinc, mercury.

355. *Formates* strongly resemble the acetates.

356. *Oxalates* are decomposed by heat; form, with lime-water, a white precipitate, which, after being exposed to a red heat, is soluble in acetic acid. The earthy oxalates are very sparingly soluble in water; the alkaline oxalates are capable of combining with excess of acid, and become less soluble.

357. *Mellates*, crystallizable.

358. *Tartrates*, by a red heat, are converted into carbonates. The earthy tartrates are scarcely soluble in water: the alkaline tartrates are soluble; but when combined with excess of acid, they become much less soluble. The tartaric acid is capable of combining at the same time with two bases. *Officinal:* Supertartrate of potass, tartrate of potass and soda.

359. *Pyrotartrate of potass*, soluble in alcohol, precipitates acetate of lead, but not the salts of barytes and lime.

360. *Citrates* are decomposed by the stronger mineral acids, and also by the oxalic and tartaric, which form an insoluble precipitate in their solutions. The alkaline citrates are decomposed by a solution of barytes.

361. *Malates* having alkalies for their base, are deliquescent. The acidulous malate of lime is soluble in cold water.

362. *Gallates* have not been particularly examined.

363. *Mucates* of potass and soda are crystallizable. Mucates with earthy and metallic bases are nearly insoluble.

364. *Benzoates*, little known, but generally forming feather-shaped crystals, and soluble in water.

365. *Succinates*, little known.

366. *Moroxylate* of lime, needle-formed crystals, permanent in the air, soluble in water, and precipitating the solutions of silver, mercury, copper, iron, cobalt, and uranium in nitric acid, and of lead and iron in acetic acid.

367. *Camphorates* have commonly a bitter taste, burn with a blue flame before the blowpipe, and are decomposed by heat, the acid subliming.

368. *Suberates* have in general a bitter taste, and are decomposed by heat.

369. *Laccate* of lime bitterish; of soda deliquescent.

370. *Sebates* are soluble salts.

371. *Prussiates* of alkalies are easily decomposed even by carbonic acid. They form variously coloured precipitates in the solutions of the metallic salts, except those of platinum.

372. *Amnates.* Very soluble in water, and the acid is precipitated from them in the form of a white crystalline powder, by the other acids.

373. The *urates* are almost insoluble in water. The suburates of soda and potass are very soluble, and the uric acid is precipitated from the solutions even by the carbonic acid.

374. *Rosates*, unknown.

375. The *muriates* have a more or less pure salt taste. They are not acted upon by any combustible body. They are all soluble in water, and are the most volatile and most difficultly decomposed by heat of the neutral salts. They emit white fumes with the sulphuric acid, and oxymuriatic acid gas with the nitric. *Officinal:* Muriates of ammonia, soda, baryta, lime, mercury, antimony. According to Sir H. Davy's view, the first only is a muriate, or combination of muriatic acid; the others are chlorides of the respective metals.

376. *Oxymuriates* or *Chlorates* give out very pure oxygen gas by the action of caloric, and become muriates. They do not destroy vegetable colours. Their acid is expelled from them with noise, by the stronger acids; and they inflame combustible bodies, even spontaneously, and with detonation.

377. *Fluates* afford, when treated with concentrated sulphuric acid, a vapour which corrodes glass, and from which the silica is afterwards precipitated by water.

378. *Fluo-borate of ammonia*, decomposed by heat; fluate of ammonia subliming, and boracic acid remaining behind.

379. *Iodates* are crystallizable, very insoluble; by the action of fire, melt and decompose easily. They detonate by percussion with combustible bodies; precipitate with silver white, and very soluble in ammonia.

380. *Hydriodates*, soluble in water, precipitate silver white, and insoluble in ammonia.

CHARACTERS OF SALTS DERIVED FROM THEIR BASES.

CLASS FIRST. *Alkaline salts.* Soluble in water, not precipitated by potass, or oxalic acid.

GENUS I. *Potass.* Sapid, bitter, crystallizable, fusible, calcinable, vitrified, or reduced to their base by heat, decomposed in general by baryta, rarely by lime. *Officinal:* Sulphate, nitrate, carbonate, supertartrate, tartrate, acetate.

G. II. *Soda.* Sapid, bitter, crystallizable, commonly containing much water of crystallization, and therefore efflorescent, and undergoing the watery fusion and exsiccation before they are melted by the fire, decomposed by baryta and potass. *Officinal:* Sulphate, muriate, phosphate, carbonate, tartrate, sub-borate.

G. III. *Ammonia.* Sapid, acrid, very soluble, either sublimed unchanged, or decomposed, losing their base partially or totally by heat, base also expelled by baryta, potass, soda, strontia, and lime. *Officinal:* Muriate, carbonate, acetate, hydrosulphuret.

CLASS SECOND. *Earthy Salts.* Either insoluble in water, or, if soluble, precipitated by sulphuric acid and carbonate of potass.

GENUS I. *Baryta.* Generally insoluble in water, and indecomposable by fire; all poisonous, and decomposed by the alkaline carbonates. *Officinal:* Sulphate, carbonate, and muriate.

G. II. *Strontia.* Generally insoluble in water, and indecomposable by fire; not poisonous, and decomposed by the alkaline carbonates, potass, soda, and baryta.

G. III. *Lime.* Generally sparingly soluble in water, decomposed by the alkaline carbonates, potass, soda, baryta, and strontia, and by oxalic acid. *Officinal:* Carbonate, muriate, phosphate.

G. IV. *Magnesia.* Generally soluble in water, and bitter; decomposed by baryta, potass, soda, strontia, and partially by ammonia. Magnesian salts, when added to ammoniacal salts, containing the same acid, quickly deposite crystals of a triple ammoniaco-magnesian salt. *Officinal:* Sulphate, carbonate.

G. V. *Glucina.* Taste sweetish; decomposed by all the preceding bases; when recently precipitated by an alkali, solu-

ble in carbonate of ammonia, precipitated by an infusion of nut-galls, and succinate of potass.

G. vi. *Alumina.* Generally soluble in water, taste sweetish and styptic; decomposed by all the preceding bases; when recently precipitated, soluble in the alkalies, and in sulphuric acid, precipitated by hydrosulphuret of potass. *Officinal*: Supersulphate.

G. vii. *Yttria.* Sweetish styptic taste; decomposed by all the preceding bases; precipitated by prussiate of potass and iron, and by infusion of galls.

G. viii. *Zirconia.* Taste austere; decomposed by all the preceding bases; precipitate not soluble in the alkalies, and when redissolved in muriatic acid, precipitated by hydrosulphuret of potass, prussiate of potass and iron, and infusion of galls.

G. ix. *Silica.* Forms only one salt with fluoric acid, which is crystallizable, soluble in excess of acid, and in the alkaline fluates.

Class third. *Metalline salts.*

1. Soluble in water, precipitated by hydrosulphuret of potass;
2. Insoluble in water, fusible with borax into a coloured glass, or with charcoal into a metallic button.

Genus i. *Gold.* Soluble in water, solution yellow, metal precipitated by sulphate of iron, sulphurous acid, and infusion of galls; prussiate of potass and iron gives a yellowish-white, and muriate of tin a purplish precipitate.

G. ii. *Platinum.* Solution in water brownish, not precipitated by prussiate of potass and iron, or infusion of galls, coloured bright red by muriate of tin, metal precipitated by sulphuretted hydrogen, precipitated orange by prussiate of mercury, and in small red crystals by potass and ammonia.

G. iii. *Silver.* Metal precipitated by copper and sulphate of iron. Precipitated white by muriatic acid and the prussiates, black by hydrosulphuret of potass, and yellowish-brown by infusion of galls. *Officinal:* Nitrate.

G. iv. *Copper.* Soluble in water; solution blue or green, rendered bright blue by ammonia, metal precipitated by iron, precipitated black by hydrosulphuret of potass, greenish-yellow by prussiate of potass and iron, green by alkaline arsenites and arseniates, and brown by oxalic acid. *Officinal:* Sulphate, ammoniaret.

G. v. *Iron.* Soluble in water. Solution green or brownish red; precipitated blue by the triple prussiates, and purple or

black by infusion of galls. *Officinal:* Sulphate, tartrate, acetate, carbonate.

G. VI. *Lead.* Insoluble salts easily reduced. Soluble salts colourless; precipitated white by triple prussiate, infusion of galls and zinc, and black by hydrosulphuret of potass. *Officinal:* Acetate, subacetate.

G. VII. *Tin.* Soluble, not precipitated by infusion of galls; precipitated white by triple prussiate and lead, black by hydrosulphuret of potass, and brown by sulphuretted hydrogen.

G. VIII. *Zinc.* Soluble; colourless; not precipitated by any metal or infusion of galls; precipitated white by alkalies, triple prussiate, hydrosulphuret of potass, and sulphuretted hydrogen. *Officinal:* Sulphate, acetate.

G. IX. *Mercury.* Volatile; precipitate by copper metallic, by triple prussiate and muriatic acid white, by hydrosulphuret of potass black, and by infusion of galls orange. *Officinal:* Muriate, submuriate, subsulphate, subnitrate.

G. X. *Tellurium.* Not precipitated by triple prussiate. Precipitate by zinc black and metallic, by hydrosulphuret of potass brown, by infusion of galls yellow, and by alkalies white, and soluble when the alkali is added in excess.

G. XI. *Antimony.* Precipitate by iron or zinc black, by hydrosulphuret of potass orange. *Officinal:* Muriate, phosphate, tartrate.

G. XII. *Bismuth.* Solution, colourless. Precipitate by copper metallic, by water and triple prussiate white, by infusion of galls orange, and by hydrosulphurets black.

G. XIII. *Manganese.* Soluble, not precipitated by gallic acid. Precipitated by alkalies, triple prussiate, and hydrosulphurets, white.

G. XIV. *Nickel.* Salts soluble; colour green, precipitate by triple prussiate dull green, by hydrosulphuret black, by infusion of galls greyish-white, and by iron, &c. metallic.

G. XV. *Cobalt.* Soluble, reddish, precipitated by alkalies blue or reddish-brown, by triple prussiate brown with a shade of blue.

G. XVI. *Uranium.* Soluble, yellow, precipitate by alkalies yellow, by alkaline carbonates white, soluble in excess of alkali, by triple prussiate brownish-red, by hydrosulphuret of potass brownish-yellow, and by infusion of glass chocolate.

G. XVII. *Titanium.* Precipitate by alkaline carbonates flaky, white; by triple prussiate and hydrosulphuret green, and by infusion of galls reddish-brown, solution coloured red by tin, and blue by zinc.

G. XVIII. *Chromium.* Precipitate by triple prussiate and hydrosulphuret green, and by infusion of galls brown.

G. XIX. *Molybdenum.* Solutions blue, precipitate by triple prussiate and tincture of galls brown.

G. XX. *Tungsten.* Unknown.

G. XXI. *Arsenic.* Precipitate by water and triple prussiate white, by hydrosulphuret of potass yellow, by sulphate of copper green, by nitrate of silver yellow.

G. XXII. *Columbium.* Colourless; precipitate by alkaline carbonates and zinc white, by triple prussiate green, by hydrosulphuret of ammonia chocolate, and by tincture of galls orange.

G. XXIII. *Iridium.* Muriatic and sulphuric solution green, nitric red; precipitate by alkalies green and red.

G. XXIV. *Osmium.* Alkaline solution coloured purple and vivid blue by infusion of galls.

G. XXV. *Rhodium.* Triple salt with soda and muriatic acid not precipitated by prussiate of potass, muriate or hydrosulphuret of ammonia, or alkaline carbonates, but by pure alkalies yellow.

G. XXVI. *Palladium.* Acid solutions red; precipitated by prussiate of mercury yellowish-white; by prussiate of potass, brown.

G. XXVII. *Cerium.* Acid solutions precipitated by alkalies white.

## SECT. II.

### PHARMACEUTICAL OPERATIONS.

#### COLLECTION AND PRESERVATION OF SIMPLES.

381. EACH of the kingdoms of nature furnishes substances which are employed in medicine, either in their natural state, or after they have been prepared by the art of pharmacy.

382. In collecting these, attention must be paid to select such as are most sound and perfect, to separate from them whatever is injured or decayed, and to free them from all foreign matters.

383. Those precautions must be taken which are best fitted for preserving them They must, in general, be defended from the effects of moisture, too great heat or cold, and confined air.

384. When their activity depends on volatile principles, they must be preserved from the contact of the air as much as possible.

385. As the vegetable kingdom presents us with the greatest number of simples, and the substances belonging to it are the least constant in their properties, and most subject to decay, it becomes necessary to give a few general rules for their collection and preservation.

386. Vegetable matters should be collected in the countries where they are indigenous; and those which grow wild, in dry soils and high situations, fully exposed to the air and sun, are in general to be preferred to those which are cultivated, or which grow in moist, low, shady, or confined places.

387. Roots which are annual, should be collected before they shoot out their stalks or flowers; biennial roots in the autumn of the first, or spring of the second year; perennial roots either in spring before the sap has begun to mount, or in harvest after it has returned.

388. Those which are worm eaten, except some resinous roots, or which are decayed, are to be rejected. The others are immediately to be cleaned with a brush and cold water, letting them lie in it as short a time as possible; and the fibres and little roots, when not essential, are to be cut away.

389. Roots which consist principally of fibres, and have but a small tap, may be immediately dried. If they be juicy, and not aromatic, this may be done by heat, not exceeding 100° of Fahrenheit; but if aromatic, by simply exposing them, and frequently turning them in a current of dry air; if very thick and strong, they are to be split or cut into slices, and strung upon threads; if covered with a tough bark, they may be peeled fresh, and then dried. Farinaceous roots are to be dipt in boiling water before they are dried. Such as lose their virtues by drying, or are directed to be preserved in a fresh state, are to be kept buried in dry sand. Ginger is peeled and preserved in syrup.

390. No very general rule can be given for the collection of herbs and leaves: some of them acquiring activity from their age; and others, as the mucilaginous leaves, from the same cause, losing the property for which they are officinal. Aromatics are to be collected after the flower-buds are formed; annuals, not aromatic, when they are about to flower, or

when in flower; biennials, before they shoot; and perennials, before they flower, especially if their fibres become woody.

391. They are to be gathered in dry weather, after the dew is off them, or in the evening, before it falls, and are to be freed from decayed, or foreign leaves. They are usually tied in bundles, and hung up in a shady, warm, and airy place; or spread upon the floor, and frequently turned. If very juicy, they are laid upon a sieve, and dried by a gentle degree of artificial warmth.

392. Sprouts are collected before the buds open; and stalks are gathered in autumn.

393. Barks and woods are collected in spring or in autumn, when the most active parts of the vegetable are concentrated in them. Spring is preferred for resinous barks, and autumn for the others which are not resinous, but rather gummy. Barks should be taken from young trees, and freed from decayed parts, and all impurities.

394. The same rules are to be followed in collecting woods, which, however, must not be taken from very young trees. Among the resinous woods, the heaviest, which sink in water, are selected. The alburnum is to be rejected.

395. Flowers are to be collected in clear dry weather, before noon, but after the dew is off, either when they are just about to open, or immediately after they have opened. Of some the petals only are preserved, and the colourless claws are even cut away; of others whose calyx is odorous, the whole flower is kept. Flowers which are too small to be pulled singly, are dried with part of the stalk; these are called heads or tops.

396. Flowers are to be dried nearly in the same manner as leaves, but more quickly, and with more attention. As they must not be exposed to the sun, it is best done by a slight degree of artificial warmth; and in some cases they should be put up in paper bags. When they lose their colour and smell, they are unfit for use.

397. Seeds and fruits, unless when otherwise directed, are to be gathered when ripe, but before they fall spontaneously. The emulsive and farinaceous seeds are to be dried in an airy, cool place; the mucilaginous seeds by the heat of a stove. Some pulpy fruits are freed from their core and seeds, strung upon thread, and dried artificially, by exposing them repeatedly to the heat of a stove. They are in general best preserved in their natural coverings, although some, as the colocynth, are peeled, and others, as the tamarind, immersed in syrup. Many seeds and fruits are apt to spoil, or become rancid;

fore, be abolished entirely; and, as weighing is too troublesome and difficult for general use, we must have recourse to small measures, accurately graduated, in the manner of Lane's *drop* measure, and the *grain* measure recommended by the Edinburgh college; but we must not be misled by their names; for they are measures of bulk, not of drops or of grains.

### SPECIFIC GRAVITY.

407. Specific gravity is the comparative weight of equal bulks of different bodies. As a standard of comparison, distilled water has been generally assumed as unity. The specific gravity of any solid is ascertained, by comparing the weight of the body in the air with its weight when suspended in water. The quotient obtained by dividing its weight in air, by the difference between its weight in air and its weight in water, is its specific gravity. The specific gravity of fluids may be ascertained by comparing the weight of a solid body, such as a piece of crystal, when immersed in distilled water, with its weight when immersed in the fluid we wish to examine; by dividing its loss of weight in the fluid by its loss of weight in the water, the quotient is the specific gravity of the fluid: or a small phial, containing a known weight of distilled water, may be filled with the fluid to be examined, and weighed, and by dividing the weight of the fluid by the weight of the water, the specific gravity is ascertained.

Although these are the only general principles by which specific gravities are ascertained, yet as the result is always influenced by the state of the thermometer and barometer at the time of the experiments, and as the manipulation is a work of great nicety, various ingenious instruments have been contrived to render the process and calculation easy. Of all these, the gravimeter of Morveau seems to deserve the preference.

It would be of material consequence to science and the arts, if specific gravities were always indicated by the numerical term expressing their relation to the specific gravity of distilled water. This, however, is unfortunately not the case. The excise in this country collect the duties paid by spiritous liquors, by estimating the proportion which they contain of a standard spirit, about 0.933 in specific gravity, which they call hydrometer proof; and they express the relation which spirits of a different strength have to the standard spirit, by saying that they are above or under hydrometer proof. Thus, one to six, or one in seven below hydrometer proof, means,

that it is equal in strength to a mixture of six parts of proof spirit with one of water.

The only other mode of expressing specific gravities, which it is necessary to notice, is that of Baumé's areometer, as it is often used in the writings of the French chemists, and is little understood in this country. For substances heavier than water, he assumes the specific gravity of distilled water as zero, and graduates the stem of his instrument downwards, each degree being supposed by him to express the number of parts of muriate of soda contained in a given solution; which, however, is not at all the case. For substances lighter than water the tube is graduated upwards, and this zero is afforded by a solution of 1 of salt in 9 water. In the appendix, tables are given of the specific gravities, corresponding with all the degrees of both of these areometers, from Nicolson's Journal.

The specific gravity of the gases differs so much from that of water, that the lightest of them, hydrogen gas, has lately been assumed as unity in regard to this class of substances.

### MECHANICAL DIVISION.

408. By mechanical division, substances are reduced to a form better adapted for medical purposes; and by the increase of their surface, their action is promoted, both as medical and chemical agents.

409. It is performed by cutting, bruising, grinding, grating, rasping, filing, pulverization, trituration, and granulation, by means of machinery or of proper instruments.

410. *Pulverization* is the first of these operations that is commonly employed in the apothecary's shop. It is performed by means of pestles and mortars. The bottom of the mortars should be concave; and their sides should neither be so inclined as not to allow the substance operated on to fall to the bottom between each stroke of the pestle, nor so perpendicular as to collect it too much together, and to retard the operation. The materials of which the pestles and mortars are formed, should resist both the mechanical and chemical action of the substances for which they are used. Wood, iron, marble, siliceous stones, porcelain, and glass, are all employed; but copper, and metals containing copper, are to be avoided.

411. They should be provided with covers, to prevent the finest and lightest parts from escaping, and to defend the operator from the effects of disagreeable or noxious substances. But these ends are more completely attained, by tying a piece

of pliable leather round the pestle, and round the mouth of the mortar. It must be closely applied, and at the same time so large, as to permit the free motion of the pestle.

412. In some instances, it will be even necessary for the operator to cover his mouth and nostrils with a wet cloth, and to stand with his back to a current of air, that the very acrid particles which arise may be carried from him.

413. The addition of a little water or spirit of wine, or of a few almonds, to very light and dry substances, will prevent their flying off. But almonds are apt to induce rancidity, and powders are always injured, by the drying which is necessary when they have been moistened. Water must never be added to substances which absorb it, or are rendered cohesive by it.

414. Too great a quantity of any substance must never be put into the mortar at a time, as it very much retards the operation.

415. All vegetable substances must be previously dried. Resins and gummy resins, which become soft in summer, must be powdered in very cold weather, and must be beaten gently, or they will be converted into a paste, instead of being powdered. Woods, roots, barks, horn, bone, ivory, &c. should be previously cut, split, chipped, or rasped. Fibrous woods and roots should be finely shaved after their bark is removed, for otherwise their powders will be full of hair-like filaments, which can scarcely be separated. Some substances will even require to be moistened with mucilage of tragacanth, or of starch, and then dried before they can be powdered. Camphor may be conveniently powdered by the addition of a little spirit of wine, or almond oil. The emulsive seeds cannot be reduced to powder, unless some dry powder be added to them. To aromatic oily substances, sugar is the best addition.

416. All impurities and inert parts having been previously separated, the operation must be continued and repeated upon vegetable substances, till no residuum is left. The powders obtained at different times must then be intimately mixed together, so as to bring the whole to a state of perfect uniformity.

417. Very hard stony substances must be repeatedly heated to a red heat, and then suddenly quenched in cold water, until they become sufficiently friable. Some metals may be powdered hot in a heated iron mortar, or may be rendered brittle by alloying them with a little mercury.

418. *Trituration* is intended for the still more minute division of bodies. It is performed in flat mortars of glass, agate,

or other hard materials, by giving a rotatory motion to the pestle; or on a levigating stone, which is generally of porphyry, by means of a muller of the same substance. On large quantities it is performed by rollers of hard stone, turning horizontally upon each other, or by one vertical roller turning on a flat stone.

419. *Levigation* differs from trituration only in the addition of water or spirit of wine to the powder operated upon, so as to form the whole mass into a kind of paste, which is rubbed until it be of sufficient smoothness or fineness. Earths, and some metallic substances, are levigated.

420. The substances subjected to this operation are generally previously powdered or ground.

421. *Granulation* is employed for the mechanical division of some metals. It is performed either by stirring the melted metal with an iron rod until it cools, or by pouring it into water, and stirring it continually as before, or by pouring it into a covered box, previously well rubbed with chalk, and shaking it until the metal cools, when the rolling motion will be converted into a rattling one. The adhering chalk is then to be washed away.

MECHANICAL SEPARATION.

422. *Sifting*. From dry substances, which are reduced to the due degree of minuteness, the coarser particles are to be separated by sieves of iron-wire, hair-cloth, or gauze, or by being dusted through bags of linen. For very light and valuable powders, or acrid substances, compound sieves, having a close lid and receiver, must be used. The particles which are not of sufficient fineness to pass through the interstices of the sieve, may be again powdered.

423. *Elutriation* is performed on mineral substances, on which water has no action, for separating them from foreign particles and impurities, of a different specific gravity, in which case they are said to be washed; or for separating the impalpable powders, obtained by trituration and levigation from the coarser particles. This process depends upon the property that very fine or light powders have of remaining for some time suspended in water; and is performed by diffusing the powder or paste formed by levigation through plenty of water, letting it stand a sufficient time, until the coarser particles settle at the bottom, and then pouring off the liquid in which the finer or lighter particles are suspended. Fresh water may be poured on the residuum, and the operation repeated; or the coarser particles which fall to the bottom may be previously levigated a second time. The fine

powder which is washed over with the water is separated from it, by allowing it to subside completely, and by decanting off the water very carefully.

424. *Decantation* is very frequently made use of for separating the clear from the turbid part of a fluid, and for separating fluids from solids, which are specifically heavier, especially when the quantity is very large, or the solid so subtile as to pass through the pores of most substances employed for filtration, or the liquid so acrid as to corrode them.

425. *Filtration.* For the purposes of separating fluids from solids, straining and filtration are often used. These differ only in degree, and are employed when the powder either does not subside at all, or too slowly and imperfectly for decantation.

426. The instruments for this purpose are of various materials, and must in no instance be acted upon by the substances for which they are employed. Fats, resins, wax and oils, are strained through hemp or flax, spread evenly over a piece of wire-cloth or net stretched in a frame. For saccharine and mucilaginous liquors, fine flannel may be used; for some saline solutions, linen. Sponge in some instances forms a convenient filter. Where these are not fine enough, unsized paper is employed, but it is extremely apt to burst by hot watery liquors. Very acrid liquors, such as acids, are filtered by means of a glass funnel, filled with powdered quartz, a few of the larger pieces being put in the neck, smaller pieces over these, and the fine powder placed over all. The porosity of this last filter retains much of the liquor; but it may be obtained by gently pouring on it an equal quantity of distilled water; the liquor will then pass through, and the water will be retained in its place.

427. Water may be filtrated in large quantities through basins of porous stone, or artificial basins of nearly equal parts of fine clay and coarse sand. In large quantities it may be easily purified *per ascensum*, the purified liquor and impurities thus taking opposite directions. The simplest apparatus of this kind is a barrel, divided perpendicularly, by a board perforated with a row of holes along the lower edge. Into each side, as much well washed sand is put as will cover these holes an inch or two, over which must be placed a layer of pebbles to keep it steady. The apparatus is now fit for use. Water poured into the one half will sink through the sand in that side, pass through the holes in the division to the other, and rise through the sand in the other half, from which it may be drawn by a stop-cock.

428. The size of the filters depends on the quantity of mat-

ter to be strained. When large, the flannel or linen is formed into a conical bag, and suspended from a hoop or frame; the paper is either spread on the inside of these bags, or folded into a conical form, and suspended by a funnel. It is of advantage to introduce glass rods or quills between the paper and funnel, to prevent them from adhering too closely.

429. What passes first is seldom fine enough, and must be poured back again, until by the swelling of the fibres of the filter, or filling up of its pores, the fluid acquires the requisite degree of limpidity. The filter is sometimes covered with charcoal powder, which is a useful addition to muddy and deep coloured liquors. The filtration of some viscid substances is much assisted by heat.

430. *Expression* is a species of filtration, assisted by mechanical force. It is principally employed to obtain the juices of fresh vegetables, and the unctuous vegetable oils. It is performed by means of a screw press, with plates of wood, iron, or tin. The subject of the operation is previously beaten, ground, or bruised. It is then inclosed in a bag, which must not be too much filled, and introduced between the plates of the press. The bags should be of hair-cloth, or canvas inclosed in hair-cloth. Hempen and woollen bags are apt to give vegetable juices a disagreeable taste. The pressure should be gentle at first, and increased gradually.

431. Vegetables intended for this operation should be perfectly fresh, and freed from all impurities. In general they should be expressed as soon as they are bruised, for it disposes them to ferment; but subacid fruits give a larger quantity of juice, and of finer quality, when they are allowed to stand some days in a wooden or earthen vessel after they are bruised. To some vegetables which are not juicy enough, the addition of a little water is necessary. Lemons and oranges must be peeled, as their skins contain a great deal of essential oil, which would mix with the juice. The oil itself may be obtained separately, by expression with the fingers on a piece of glass.

432. For unctuous seeds iron plates are used; and it is customary not only to heat the plates, but to warm the bruised seeds in a kettle over the fire, after they have been sprinkled with water, as by these means the product is increased, and the oil obtained is more limpid. But as the oils obtained in this way are more disposed to rancidity, this process should either be laid aside altogether, or changed to exposing the bruised seeds, inclosed in a bag, to the steam of hot water.

433. *Despumation* is generally practised on thick and clammy liquors, which contain much slimy and other impurities,

not easily separable by filtration. The scum is made to arise, either by simply heating the liquor, or by *clarifying* it, which last is done by mixing with the liquor, when cold, white of egg well beaten with a little water, which on being heated coagulates, and rises to the surface, carrying with it all the impurities. The liquor may now be filtered with ease, or may be skimmed with a perforated laddle. Spiritous liquors are clarified, without the assistance of heat, by means of isinglass dissolved in water, or of any albuminous fluid, as milk, which coagulates with the action of alcohol. Some expressed juices, as those of all the antiscorbutic plants, are instantly clarified by the addition of any vegetable acid, as the juice of bitter oranges.

434. Fluids can only be separated from each other, when they have no tendency to combine, and when they differ in specific gravity. The separation may be effected by skimming off the lighter fluid with a silver or glass spoon; or by drawing it off by a syringe or syphon; or by means of a glass separatory, which is an instrument having a projecting tube, terminating in a very slender point, through which the heavier fluid alone is permitted to run; or by means of the capillary attraction of a spongy woollen thread; for no fluid will enter a substance whose pores are filled by another, for which it has no attraction; and, lastly, upon the same principle, by means of a filter of unsized paper, previously soaked in one of the fluids, which in this way readily passes through it, while the other remains behind.

435. *Mechanical mixture* is performed by agitation, trituration, or kneading; but these will be best considered in treating of the forms in which medicines are exhibited.

### APPARATUS.

436. Before entering on the chemical operations, it will be necessary to make a few remarks on the instruments employed in performing them. They may be divided into

*a*. The vessels in which the effects are performed;
*b*. Fuel, or the means of producing heat; and
*c*. The means of applying and regulating the heat, or lamps and furnaces.

### VESSELS.

437. The vessels, according to the purposes for which they are intended, vary

*a*. In form; and
*b*. In materials.

438. The different forms will be best described when treating of the particular operations.

439. No substance possesses properties which render it proper to be employed as a material in every instance. We are therefore obliged to select those substances which possess the properties more especially required in the particular operations for which they are intended.

440. The properties most generally required, are

*a*. The power of resisting chemical agents;
*b*. Transparency;
*c*. Compactness;
*d*. Strength;
*e*. Fixity and infusibility;
*f*. And the power of bearing sudden variations of temperature without breaking.

441. The metals in general possess the four last properties in considerable perfection, but they are all opaque. Iron and copper are apt to be corroded by chemical agents, and the use of the latter is often attended with dangerous consequences. These objections are in some measure, but not entirely, removed by tinning them. Tin and lead are too fusible. Platinum, gold, and silver, resist most of the chemical agents, but their expence is an insurmountable objection to their general use.

442. Good earthen ware resists the greatest intensity of heat, but is deficient in all the other properties. The basis of all kinds of earthen ware is clay, which possesses the valuable quality of being very plastic when wrought with water, and of becoming extremely hard when burnt with an intense heat. But it contracts so much by heat, that it is extremely apt to crack and split, on being exposed to sudden changes of temperature; it is therefore necessary to add some substance which may counteract this property. Siliceous sand, clay burnt with a very intense heat, and then reduced to powder, and plumbago, are occasionally used. These additions, however, are attended with other inconveniences; plumbago, especially, is liable to combustion, and sand diminishes the compactness, so that it becomes necessary to glaze most kinds of earthen ware; but when glazed, they are acted upon by chemical agents. The vessels manufactured by Messrs Wedgwood are the best of this description, except those of porcelain, which are too expensive.

443. Glass possesses the three first qualities in an eminent degree, and may be heated red hot without melting. Its greatest inconvenience is its disposition to crack, or break in

pieces, when suddenly heated or cooled. As this is occasioned by its unequal expansion or contraction, glass vessels should be made very thin, and of a round form. They should also be well annealed, that is cooled very slowly, when blown, by placing them immediately in a heated oven, while they are yet in a soft state. When ill annealed, or cooled suddenly, glass is apt to fly in pieces on the slightest change of temperature, or touch of a sharp point. We sometimes take advantage of this imperfection; for by means of a red-hot wire, charcoal, or bit of a tobacco-pipe, glass-vessels may be cut into any shape. When there is not a crack already in the glass, the point of the wire is applied near the edge, a crack is formed, which is afterwards easily led in any direction.

444. Reaumeur's porcelain, on the contrary, is glass, which by surrounding it with hot sand, is made to cool so slowly, that it assumes a crystalline texture, which destroys its transparency, but imparts to it every other quality wished for in chemical vessels. The coarser kinds of glass are commonly used in making it; but as there is no manufacture of this valuable substance, its employment is still very limited.

## LUTES.

445. Lutes also form a necessary part of chemical apparatus. They are compositions of various substances, intended,

*a.* To close the joinings of vessels;
*b.* To coat glass vessels.
*c.* To line furnaces.

446. Lutes of the first description are commonly employed to confine elastic vapours. They should therefore possess the following properties:

*a.* Viscidity, plasticity, and compactness;
*b.* The power of resisting acrid vapours;
*c.* The power of resisting certain degrees of heat.

447. The viscidity of lutes depends on the presence either of

*a.* Unctuous or resinous substances;
*b.* Mucilaginous substances; or
*c.* Clay or lime.

448. Lutes of the first kind possess the two first class of properties in an eminent degree; but they are in general so fusible, that they cannot be employed when they are exposed

even to very low degrees of heat, and they will not adhere to any substance that is at all moist. Examples.

*a.* Eight parts of yellow wax, melted with one of oil of turpentine, with or without the addition of resinous substances, according to the degree of pliability and consistence required. Lavoisier's lute.

*b.* Four parts of wax, melted with two of varnish and one of olive oil. Saussure's lute.

*c.* Three parts of powdered clay, worked up into a paste, with one of drying oil, or, what is better, amber varnish. The drying oil is prepared by boiling 22.5 parts of litharge in 16 of linseed oil until it be dissolved. Fat lute.

*d.* Chalk and oil, or glazier's putty, is well fitted for luting tubes permanently into glass vessels, for it becomes so hard that it cannot be easily removed.

*e.* Equal parts of litharge, quicklime, and powdered clay, worked into a paste with oil varnish, is sometimes applied over the cracks in glass vessels, so as to fit them for some purposes.

*f.* Melted pitch and brick dust.

449. Mucilaginous substances, such as flour, starch, gum, and glue, mixed with water, are sufficiently adhesive, are dried by moderate degrees of heat, and are easily removed after the operation, by moistening them with water; but a high temperature destroys them, and they do not resist corrosive vapours. The addition of an insoluble powder is often necessary to give them a sufficient degree of consistency. Examples.

*a.* Slips of bladder, softened in water, and applied with the inside next the vessels. They are apt, however, from their great contraction in drying, to break weak vessels.

*b.* One part of gum-arabic with six or eight of chalk, formed into a paste with water.

*c.* Flour worked into a paste with powdered clay or chalk.

*d.* Almond or linseed meal formed into a paste with mucilage or water.

*e.* Quicklime in fine powder, hastily mixed with white of egg, and instantly applied, sets very quickly, but becomes so hard that it can scarcely be removed.

*f.* Slaked lime in fine powder, with glue, does not set so quickly as the former.

*g.* The cracks of glass vessels may be cemented by daubing them and a suitable piece of linen over with

white of egg, strewing both over with finely powdered quicklime, and instantly applying the linen closely and evenly.

450. Earthy lutes resist very high temperatures, but they become so hard that they can scarcely be removed, and often harden so quickly after they are mixed up, that they must be applied immediately. Examples.

*a.* Quicklime well incorporated with a sixth part of muriate of soda.

*b.* Burnt gypsum, made up with water.

*c.* One ounce of borax dissolved in a pound of boiling water, mixed with a sufficient quantity of powdered clay. Mr Watt's fire lute.

*d.* One part of clay with four of sand, formed into a paste with water. This is also used for coating glass vessels, in order to render them stronger, and capable of resisting intense heat. It is then made into a very thin mass, and applied in successive layers, taking care that each coat be perfectly dry before another be laid on.

451. The lutes for lining furnaces will be described when treating of furnaces.

452. The junctures of vessels which are to be luted to each other, should previously be accurately and firmly fitted, by introducing between them, when necessary, short pieces of wood or cork, or, if the disproportion be very great, by means of a cork fitted to the one vessel, having a circular hole bored through it, through which the neck of the other vessel or tube may pass.

453. After being thus fitted, the lute is either applied very thin, by spreading it on slips of linen or paper, and securing it with thread; or if it is a paste lute, it is formed into small cylinders, which are successively applied to the junctures, taking care that each piece be made to adhere firmly and perfectly close in every part before another is put on. Lastly, the whole is secured by slips of linen or bladder.

454. In many cases, to permit the escape of elastic vapours, a small hole is made through the lute with a pin or the lute is perforated by a small quill, fitted with a stopper.

### HEAT AND FUEL.

455 As caloric is an agent of the most extensive utility in the chemical operations of pharmacy, it is necessary that we

should be acquainted with the means of employing it in the most economical and efficient manner.

456. The rays of the sun are used in the drying of many vegetable substances; and the only attentions necessary, are to expose as large a surface as possible, and to turn them frequently, that every part may be dried alike. They are also sometimes used for promoting spontaneous evaporation.

457. Combustion is a much more powerful and certain source of heat. Alcohol, oil, tallow, wood, turf, coal, charcoal, and coke, are all occasionally employed.

458. Alcohol, oil, and melted tallow, can only be burnt on porous wicks, which draw up a portion of the fluid to be volatilized and inflamed. Fluid inflammables are therefore burnt in lamps of various constructions. But although commonly used to produce light, they afford an uniform, but not high temperature. This may however be increased, by increasing the number and size of the wicks. Alcohol produces a steady heat, no soot, and, if strong, leaves no residuum. Oil gives a higher temperature, but on a common wick produces much smoke and soot. These are diminished, and the light and heat increased, by making the surface of the flame bear a large proportion to the centre; which is best done by a cylindrical wick, so contrived that the air has free access both to the outside and inside of the cylinder, as in Argand's lamp, invented by Mr Bolton of Birmingham. In this way, oil may be made to produce a considerable temperature, of great uniformity, and without the inconvenience of smoke.

459. Wicks have the inconvenience of being charred by the high temperature to which they are subjected, and becoming so clogged as to prevent the fluid from rising in them. They must then be trimmed; but this is seldomer necessary with alcohol and fine oils than with the coarser oils. Lamps are also improved by adding a chimney to them. It must admit the free access of air to the flame, and then it increases the current, confines the heat, and steadies the flame. The intensity of the temperature of flame may be greatly increased by forcing a small current of hot air through it, as by the blowpipe.

460. Wood, turf, coal, charcoal, and coke, solid combustibles, are burnt in grates and furnaces. Wood has the advantage of kindling readily, but affords a very unsteady temperature, is inconvenient from its flame, smoke, and soot, and requires much attention. The heavy and dense woods give the greatest heat, burn longest, and leave a dense charcoal.

461. Dry turf gives a steady heat, and does not require so much attention as wood; but it consumes fast, its smoke is

copious and penetrating, and the empyreumatic smell which it imparts to every thing it comes in contact with, adheres to them with great obstinacy. The heavy turf of marshes is preferable to the light surface turf.

462. Coal is the fuel most commonly used in this country. Its heat is considerable, and sufficiently permanent, but it produces much flame and smoke.

463. Charcoal, especially of the dense woods, is a very convenient and excellent fuel. It burns without flame or smoke, and gives a strong, uniform, and permanent heat, which may be easily regulated, especially when it is not in too large pieces, and is a little damp. But it is costly, and burns quickly.

464. Coke, or charred coal, possesses similar properties with charcoal; it is less easily kindled, but is capable of producing a higher temperature, and burns more slowly.

465. When an open grate is used for chemical purposes, it should be provided with cranes to support the vessels, that they may not be overturned by the burning away of the fuel.

## FURNACES.

466. In all furnaces, the principal objects are, to produce a sufficient degree of heat, with little consumption of fuel, and to be able to regulate the degree of heat.

467. An unnecessary waste of fuel is prevented by forming the sides of the furnace of very imperfect conductors of caloric, and by constructing it so that the subject operated on may be exposed to the full action of the fire.

468. The degree of heat is regulated by the quantity of air which comes in contact with the burning fuel. The quantity of air is in the compound ratio of the size of the aperture through which it enters, and its velocity. The velocity may be increased by mechanical means, as by bellows, or by increasing the height and width of the chimney.

369. The size and form of furnaces, and the materials of which they are constructed, are various, according to the purposes for which they are intended.

470. The essential parts of a furnace are,

*a.* A body for the fuel to burn in;
*b.* A grate for it to burn upon;
*c.* An ash-pit to admit air and receive the ashes;
*d.* A chimney for carrying off the smoke and vapours.

471. The ash-pit should be perfectly close, except the door, which should be furnished with a register-plate, to regulate the quantity of air admitted.

472. The bars of the grate should be triangular, and placed with an angle pointed downwards, and not above half an inch distant. The grate should be fixed on the outside of the body.

473. The body may be cylindrical or elliptical, with apertures for introducing the fuel and the subjects of the operation, and for conveying away the smoke and vapours.

474. When the combustion is supported by the current of air naturally excited by the burning of the fuel, it is called a wind furnace; when it is accelerated by increasing the velocity of the current by bellows, it forms a blast-furnace; and when the body of the furnace is covered with a dome, which terminates in the chimney, it constitutes a reverberatory furnace.

475. Furnaces are either fixed and built of fire-brick, or portable, and fabricated of plate-iron. When of iron, they must be lined with some badly conducting and refractory substance, both to prevent the dissipation of heat, and to defend the iron against the action of the fire. A mixture of scales of iron and powdered tiles, worked up with blood, hair, and clay, is much recommended; and Professor Hagen says, that it is less apt to split and crack when exposed at once to a violent heat, than when dried gradually, according to the common directions. Dr Black employed two different coatings. Next to the iron, he applied a composition of three parts by weight of charcoal, and one of fine clay, first mixed in the state of fine powder, and then worked up with as much water as permitted the mass to be formed into balls, which were applied to the sides of the furnace, and beat very firm and compact with the face of a broad hammer, to the thickness of about one inch and a half in general, but so as to give an elliptical form to the cavity. Over this, another lute, composed of six or seven parts of sand, and one of clay, was applied, in the same manner, to the thickness of about half an inch. These lutes must be allowed to become perfectly dry before the furnace is heated, which should at first be done gradually. They may also be lined with fire bricks of a proper form, accurately fitted and well-cemented together before the top-plate is screwed on.

476. The general fault of furnaces is, that they admit so much air, as to prevent us from regulating the temperature, which either becomes too violent and unmanageable, or when more cold air is admitted than what is necessary for supporting the combustion, the heat is carried off, and the temperature cannot be raised sufficiently. The superior merit of Dr Black's furnace consists in the facility with which the admis-

sion of air is regulated; and every attempt hitherto made to improve it, by increasing the number of its apertures, have in reality injured it.

477. Heat may be applied to vessels employed in chemical operations,

*a*. Directly, as in the open fire and reverberatory furnace;
*b*. Or through the medium of sand; the sand bath;
*c*. Of water; the water bath;
*d*. Of steam; the vapour bath;
*e*. Of air, as in the muffle.

### CHEMICAL OPERATIONS.

478. In all chemical operations, combination takes place, and there are very few of them in which decomposition does not also occur. For the sake of method, we shall consider them as principally intended to produce,

*a*. Change in the form of aggregation;
*b*. Combination;
*c*. Decomposition.

479. The form of aggregation may be altered by,

*a*. Fusion;
*b*. Vaporization;
*c*. Condensation;
*d*. Congelation;
*e*. Coagulation.

480. *Liquefaction* is commonly employed to express the melting of substances, as tallow, wax, resin, &c. which pass through intermediate states of softness before they become fluid.

481. *Fusion* is the melting of substances which pass immediately from the solid to the fluid state, as the salts and the metals, except iron and platinum. Substances differ very much in the degrees of their fusibility; some, as water and mercury, existing as fluids in the ordinary temperatures of the atmosphere; while others, as the pure earths, cannot be melted by any heat we can produce.

482. When a substance acquires by fusion a degree of transparency, a dense uniform texture, and great brittleness, and exhibits a conchoidal fracture, with a specular surface, and the edges of the fragments very sharp, it is said to be *vitrified*.

483. In general, simple substances are less fusible than compounds; thus the simple earths cannot be melted singly,

but when mixed are easily fused. The additions which are sometimes made to refractory substances to promote their fusion, are termed *fluxes*.

484. These fluxes are generally saline bodies.

*a*. The alkalies, potass, and soda, promote powerfully the fusion of siliceous stones; but they are only used for accurate experiments. The *white flux* is a mixture of a little potass with carbonate of potass, and is prepared by deflagrating together equal parts of nitrate of potass and supertartrate of potass. When an oxide is at the same time to be reduced, the *black* flux is to be preferred, which is produced by the deflagration of two parts of supertartrate of potass, and one of nitrate of potass. It differs from the former only in containing a little charcoal. Soap promotes fusion by being converted by the fire into carbonate of soda and charcoal.

*b*. Aluminous stones have their fusion greatly promoted by the addition of sub-borate of soda.

*c*. Muriate of soda, the mixed phosphate of soda and ammonia, and other salts, are also occasionally employed.

485. An open fire is sufficient to melt some substances; others require the heat of a furnace.

486. The vessels in which fusion is performed, must resist the heat necessary for the operation. In some instances, an iron or copper ladle or pot may be used; but most commonly crucibles are employed. *Crucibles* are of various sizes.—The large crucibles are generally conical, with a small spout for the convenience of pouring out: the small ones are truncated triangular pyramids, and are commonly sold in nests.

487. The Hessian crucibles are composed of clay and sand, and when good, will support an intense heat for many hours, without softening or melting; but they are disposed to crack when suddenly heated or cooled. This inconvenience may be on many occasions avoided, by using a double crucible, and filling up the interstice with sand, or by covering the crucible with a lute of clay and sand, by which means the heat is transmitted more gradually and equally. Those which give a clear sound when struck, and are of an uniform thickness, and have a reddish-brown colour, without black spots, are reckoned the best.

488. Wedgwood's crucibles are made of clay mixed with baked clay finely pounded, and are in every respect superior to the Hessian, but they are expensive.

489. The black lead crucibles, formed of clay and plumba-

go, are very durable, resist sudden changes of temperature, and may be repeatedly used; but they are destroyed when saline substances are melted in them, and suffer combustion when exposed red-hot to a current of air.

490. When placed in a furnace, crucibles should never be set upon the bars of the grate, but always upon a support. Dr Kennedy found the hottest part of a furnace to be about an inch above the grate. They may be covered, to prevent the fuel or ashes from falling into them, with a lid of the same materials, or with another crucible inverted over them.

491. When the fusion is completed, the substance may be either permitted to cool in the crucible, or poured into a heated mould anointed with tallow, never with oil, or what is still better, covered with a thin coating of chalk, which is applied by laying it over with a mixture of chalk diffused in water, and then evaporating the water completely by heat. To prevent the crucible from being broken by cooling too rapidly, it should be either replaced in the furnace, to cool gradually with it, or covered with some vessel to prevent its being exposed immediately to the air.

492. Fusion is performed with the intentions,

*a.* Of weakening the attraction of aggregation,
  1. To facilitate mechanical division;
  2. To promote chemical action.

*b.* Of separating from each other, substances of different degrees of fusibility.

493. *Vaporization* is the conversion of a solid or fluid into vapour by the agency of caloric. Although vaporability be merely a relative term, substances are said to be permanently elastic, volatile, or fixed. The permanently elastic fluids or gases are those which cannot be condensed into a fluid or solid form by any abstraction of caloric we are capable of producing. Fixed substances, on the contrary, are those which cannot be converted into vapour, by great increase of temperature. The pressure of the atmosphere has a very considerable effect in varying the degree at which substances are converted into vapour. Some solids, unless subjected to very great pressure, are at once converted into vapour, although most of them pass through the intermediate state of fluidity.

494. Vaporization is employed,

*a.* To separate substances differing in volatility.
*b.* To promote chemical action, by disaggregating them.

495. When employed with either of these views, either

*a.* No regard is paid to the substances volatilized,
   1. From solids, as in ustulation and charring;
   2. From fluids, as in evaporation;

*b.* Or the substances vaporized are condensed in proper vessels,
   1. In a liquid form, as in distillation,
   2. In a solid form, as in sublimation;

*c.* Or the substances disengaged are permanently elastic, and are collected in their gaseous form, in a pneumatic apparatus.

496. *Ustulation* is almost entirely a metallurgic operation, and is employed to expel the sulphur and arsenic contained in some metallic ores. On small quantities it is performed in tests placed within a muffle. Tests are shallow vessels made of bone ashes, or baked clay. Muffles are vessels of baked clay, of a semi-cylindrical form, the flat side forming the floor, and the arched portion the roof and sides. The end and sides are perforated with holes for the free transmission of the heated air, and the open extremity is placed at the door of the furnace, for the inspection and manipulation of the process. The reverberatory furnace is commonly employed for roasting, and the heat is very gentle at first, and slowly raised to redness. The process is accelerated by exposing as large a surface of the substance to be roasted as possible, and by stirring it frequently, so as to prevent any agglutination, and to bring every part in succession to the surface.

497. *Charring* may be performed on any of the compound oxides, by subjecting them to a degree of heat sufficient to expel all their hydrogen, nitrogen, and oxygen, while the carbon, being a fixed principle, remains behind in the state of charcoal. The temperature necessary for the operation may be produced either by the combustion of other substances, or by the partial combustion of the substance to be charred. In the former case, the operation may be performed in any vessel which excludes the air while it permits the escape of the vapours formed. In the latter, the access of air must be regulated in such a manner, that it may be suppressed whenever the combustion has reached the requisite degree; for if continued to be admitted, the charcoal itself would be dissipated in the form of carbonic acid gas, and nothing would remain but the alkaline and earthy matter, which these substances always contain. When combustion is carried this length, the process is termed *incineration.* The vapours which arise in the operation of charring are sometimes condensed, as in the manufacture of tar.

498. *Evaporation* is the conversion of a fluid into vapour, by its combination with caloric. In this process, the atmosphere is not a necessary agent, but rather a hindrance, by its pressure. This forms a criterion between evaporation and spontaneous evaporation, which is merely the solution of a fluid in air.

499. It is performed in open, shallow, or hemispherical vessels of silver, tinned copper or iron, earthen ware or glass. The necessary caloric may be furnished by means of an open fire, a lamp or a furnace, and applied either directly, or by the intervention of sand, water, or vapour. The degree of heat must be regulated by the nature of the substance operated on. In general, it should not be greater than what is absolutely necessary.

500. Evaporation may be,

*a.* Partial:
  1. From saline fluids, Concentration;
  2. From viscid fluids, Inspissation.

*b.* Total, Exsiccation.

501. *Concentration* is employed,

*a.* To lessen the quantity of diluting fluids; Dephlegmation:

*b.* As a preliminary step to Crystallization.

502. *Inspissation* is almost confined to animal and vegetable substances; and as these are apt to be partially decomposed by heat, or to become empyreumatic, the process should always be performed, especially towards the end, in a water or vapour bath.

503. *Exsiccation* is here taken in a very limited sense; for the term is also with propriety used to express the drying of vegetables by a gentle heat, the efflorescence of salts, and the abstraction of moisture from mixtures of insoluble powders with water, by means of chalk stones, or powdered chalk pressed into a smooth mass. At present, we limit its meaning to the total expulsion of moisture from any body by means of caloric.

504. The exsiccation of compound oxides should always be performed in the water bath.

505. Salts are deprived of their water of crystallization by exposing them to the action of heat in a glass vessel or iron ladle. Sometimes they first dissolve in their water of crystallization (or undergo what is called the *watery fusion*,) and are afterwards converted into a dry mass by its total expulsion; as in the calcination of borax or burning of alum.

506. When exsiccation is attended with a crackling noise, and the splitting of the salt, as in muriate of soda, it is termed *decrepitation*, and is performed by throwing into a heated iron vessel, small quantities of the salt at a time, covering it up, and waiting until the decrepitation be over, before a fresh quantity is thrown in.

507. Exsiccation is performed on saline bodies, to render them more acrid or pulverulent, or to prepare them for chemical operations. Animal and vegetable substances are exsiccated to give them a solid form, and to prevent their fermentation.

508. *Condensation* is the reverse of expansion, and is produced either,

*a.* By mechanical pressure forcing out the caloric in a sensible form, as water is squeezed out of a sponge; or,
*b.* By the chemical abstraction of caloric, which is followed by an approximation of the particles of the substance.

509. The latter species of condensation only is the object of our investigation at present. In this way we may be supposed to condense,

*a.* Substances existing naturally as gases or vapours;
*b.* Substances, naturally solid or fluid, converted into vapours by adventitious circumstances.

510. The former instance is almost supposititious; for we are not able, by any diminution of temperature, to reduce the permanently elastic fluids to a fluid or solid state.

511. The latter instance is always preceded by vaporization, and comprehends those operations in which the substances vaporised are condensed in proper vessels. When the product is a fluid, it is termed distillation; when solid, sublimation.

512. *Distillation* is said to be performed,

*a.* *Viâ humidâ*, when fluids are the subject of the operation;
*b.* *Viâ siccâ*, when solids are subjected to the operation, and the fluid product arises from decomposition, and a new arrangement of the constituent principles.

513. The objects of distillation are,

*a.* To separate more volatile fluids from less volatile fluids or solids;
*b.* To promote the union of different substances;
*c.* To generate new products by the action of fire.

514. In all distillations, the heat applied should not be

greater than what is necessary for the formation of the vapour, and even to this degree it should be gradually raised. The vessels also in which the distillation is performed should never be filled above one-half, and sometimes not above one-fourth, lest the substance contained in them should boil over.

515. As distillation is a combination of evaporation and condensation, the apparatus consists of two principal parts ;

*a*. The vessels in which the vapours are formed ;
*b*. The vessels in which they are condensed.

516. The vessels employed for both purposes are variously shaped, according to the manner in which the operation is conducted. The first difference depends on the direction of the vapour after its formation. It either

*a*. Descends ; distillation *per descensum :*
*b*. Ascends ; distillation *per ascensum :*
*c*. Or passes off by the side ; distillation *per latus.*

517. In the distillation *per descensum*, a perforated plate, generally of tinned iron, is fixed within any convenient vessel, so as to leave a space beneath it. The subject of the operation is laid on this plate, and is covered by another, accurately fitting the vessel, and sufficiently strong to support the fuel which is burnt upon it. Thus the heat is applied from above, and the vapour is forced to descend into the inferior cavity, where it is condensed. In this way the oil of cloves is prepared, and on the same principles tar is manufactured, and mercury and zinc are separated from their ores.

518. In the distillation *per ascensum*, the vapour is allowed to arise to some height, and then is conveyed away to be condensed. The vessel most commonly employed for this purpose is the common copper-still, which consists of a body for containing the materials, and a head into which the vapour ascends. From the middle of the head a tube arises a short way, and is then reflected downwards, through which the steam passes to be condensed. Another kind of head, rising to a great height before it is reflected, is sometimes used for separating fluids, which differ little in volatility, as it was supposed that the less volatile vapours would be condensed, and fall back into the still, while only the more volatile vapours would arise to the top, so as to pass to the refrigeratory. The same object may be more conveniently attained by managing the fire with caution and address. The greater the surface exposed, and the less the height the vapours have to ascend, the more rapidly does the distillation proceed ; and so well are these principles understood by the Scotch distillers, that they

do not take more than three minutes to discharge a still containing 50 gallons of fluid.

519. The condensing apparatus used with the common still is very simple. The tube in which the head terminates, is inserted into the upper end of a pipe, which is kept cool by passing through a vessel filled with water, called the Refrigeratory. This pipe is commonly made of a serpentine form: but as this renders it difficult to be cleaned, Dr Black recommends a sigmoid pipe. The refrigeratory may be furnished with a stop-cock, that when the water it contains becomes too hot, and does not condense all the vapour produced, it may be changed for cold water. From the lower end of the pipe, the product of the distillation drops into the vessel destined to receive it; and we may observe, that when any vapour issues along with it, we should either diminish the power of the fire, or change the water in the refrigeratory.

520. *Circulation* was a process formerly in use. It consisted in arranging the apparatus, so that the vapours were no sooner condensed into a fluid form, than this fluid returned back into the distilling vessels, to be again vaporized; and was effected by distilling in a glass vessel, with so long a neck that the vapours were condensed before they escaped at the upper extremity, or by inverting one matrass within another.

521. When corrosive substances are distilled *per ascensum*, the cucurbit and alembic are used; but these substances are more conveniently distilled *per latus*.

522. The distillation *per latus* is performed in a retort, or pear-shaped vessel, having the neck bent to one side. The body of a good retort is well rounded, uniform in its appearance, and of an equal thickness, and the neck is sufficiently bent to allow the vapours, when condensed, to run freely away, but not so much as to render the application of the receiver inconvenient, or to bring it too near the furnace. The passage from the body into the neck must be perfectly free and sufficiently wide, otherwise the vapours produced in the retort only circulate in its body, without passing over into the receiver. For introducing liquors into the retort without soiling its neck, which would injure the product, a bent funnel is necessary. It must be sufficiently long to introduce the liquor directly into the body of the retort; and in withdrawing it, we must keep it carefully applied to the upper part of the retort, that the drop hanging from it may not touch the inside of the neck. In some cases, where a mixture of different substances is to be distilled, it is convenient and necessary to have the whole apparatus properly adjusted before the mixture is made, and we must therefore employ a tubulated

retort, or a retort furnished with an aperture, accurately closed with a ground stopper.

523. The tubulature should be placed on the upper convex part of the retort before it bends to form the neck, so that a fluid poured through it may fall directly into the body without soiling the neck.

524. Retorts are made of various materials. Flint-glass is commonly used when the heat is not so great as to melt it. For distillations which require excessive degrees of heat, retorts of earthen ware, or coated glass retorts, are employed. Quicksilver is distilled in iron retorts.

525. The simplest condensing apparatus used with the retort is the common glass receiver; which is a vessel of a conical or globular form, having a neck sufficiently wide to admit the neck of a retort. To prevent the loss and dissipation of the vapours to be condensed, the retort and receiver may be accurately ground to each other, or secured by some proper lute. Means must also be used to prevent the receiver from being heated by the caloric evolved during the condensation of the vapours. It may either be immersed in cold water, or covered with snow or pounded ice; or a constant evaporation may be supported from its surface, by covering it with a cloth, kept moist by means of the descent of water, from a vessel placed above it, through minute syphons or spongy worsted threads. But as, during the process of distillation, permanently elastic fluids are often produced, which would endanger the breaking of the vessels, these are permitted to escape, either through a tubulature, or hole in the side of the receiver, or rather through a hole made in the luting. Receivers having a spout issuing from their side, are used when we wish to keep separate the products obtained at different periods of any distillation. For condensing very volatile vapours, a series of receivers, communicating with each other, termed Adopters, were formerly used; but these are now entirely superseded by Woulfe's apparatus.

526. This apparatus consists of a tubulated retort, adapted to a tubulated receiver. With the tubulature of the receiver a three-necked bottle is connected by means of a bent tube, the further extremity of which is immersed, one or more inches, in some fluid contained in the bottle. A series of two or three similar bottles are connected with this first bottle in the same way. In the middle tubulature of each bottle, a glass tube is fixed, having its lower extremity immersed about a quarter of an inch in the fluid. The height of the tube above the surface of the fluid must be greater than the sum of the columns of fluid standing over the farther extremities of the

connecting tubes, in all the bottles or vessels more remote from the retort. Tubes so adjusted are termed Tubes of safety, for they prevent that reflux of fluid from the more remote into the nearer bottles, and into the receiver itself, which would otherwise inevitably happen, on any condensation of vapoūr taking place in the retort, receiver, or nearer bottles. Different contrivances for the same purpose have been described by Messrs Welter and Burkitt; and a very ingenious mode of connecting the vessels without lute has been invented by Citizen Girard, but they would not be easily understood without plates. The further tubulature of the last bottle is commonly connected with a pneumatic apparatus, by means of a bent tube. When the whole is properly adjusted, air blown into the retort should pass through the receiver, rise in bubbles through the fluids contained in each of the bottles, and at last escape by the bent tube. In the receiver, those products of distillation are collected, which are condensable by cold alone. The first bottle is commonly filled with water, and the others with alkaline solutions, or other active fluids; and as the permanently elastic fluids produced are successively subjected to the action of all these, only those gases will escape by the bent tube which are not absorbable by any of them.

### PNEUMATIC APPARATUS.

527. The great importance of the elastic fluids in modern chemistry has rendered an acquaintance with the means of collecting and preserving them indispensable.

528. When a gas is produced by any means, it may be received either,

*a.* Into vessels absolutely empty; or

*b.* Into vessels filled with some fluid, on which it exerts no action.

529. The first mode of collecting gases may be practised by means of a bladder, moistened sufficiently to make it perfectly pliable, and then compressed so as to empty it entirely. In this state it may be easily filled with any gas. An oiled silk bag will answer the same purpose, and is more convenient in some respects, as it may be made of any size or form.

530. Glass or metallic vessels, such as balloons, may also be emptied for the purpose of receiving gases, by fitting them with a stop-cock, and exhausting the air from them by means of an air-pump.

531 But the second mode of collecting gases is the most convenient and common.

532. The vessels may be filled either,

*a.* With a fluid lighter; or

*b.* Heavier than the gas to be received into it.

533. The former method is seldom employed; but if we conduct a stream of any gas heavier than atmospheric air, such as carbonic acid gas, muriatic acid gas, &c. to the bottom of any vessel, it will gradually displace the air, and fill the vessel.

534. On the contrary, a gas lighter than the atmospheric air, such as hydrogen, may be collected in an inverted vessel, by conducting a stream of it to the top.

535. But gases are most commonly collected by conducting the stream of gas into an inverted glass jar, or any other vessel filled with water or mercury. The gas ascends to the upper part of the vessel, and displaces the fluid. In this way gas may be kept a very long time, provided a small quantity of the fluid be left in the vessels, which prevents both the escape of the gas, and the admission of atmospheric air.

536. The vessels may be of various shapes; but the most commonly employed are cylindrical. They may be either open only at one extremity, or furnished at the other with a stop-cock.

537. The manner of filling these vessels with fluid is to immerse them completely in it, with the open extremity directed a little upwards, so that the whole air may escape from them, and then inverting them with their mouths downwards.

538. For filling them with convenience, a trough or cistern is commonly used. This either should be hollowed out of a solid block of wood or marble; or, if it be constructed of wood, it should be well painted, or lined with lead or tinned copper. Its size may vary very much; but it should contain a sufficient depth of fluid to cover the largest transverse diameter of the vessels to be filled in it. At one end or side, there should be a shelf for holding the vessels after they are filled. This shelf should be placed about an inch and a half below the surface of the fluid, and should be perforated with several holes, forming the apices of corresponding conical excavations on the lower side, through which, as through inverted funnels, gaseous fluids may be more easily introduced into the vessels placed over them. In general, the vessels used with a mercurial apparatus should be stronger and smaller than those for a water-cistern.

539. We should also have a variety of glass and elastic tubes for conveying the gases from the vessels in which they are formed to the funnels under the shelf.

540. *Rectification* is the repeated distillation of any fluid. When distillation renders the fluid stronger, or abstracts water from it, it is termed *Dephlegmation.* When a fluid is distilled off from any substance, it is called *Abstraction*; and if the product be redistilled from the same substance, or a fresh quantity of the substance, it is denominated *Cohobation.*

541. *Sublimation* differs from distillation only in the form of the product. When it is compact, it is termed a Sublimate; when loose and spongy, it formerly had the improper appellation of Flowers. Sublimation is sometimes performed in a crucible, and the vapours are condensed in a paper cone, or in another crucible inverted over it; sometimes in the lower part of a glass flask, cucurbit, or phial, and the condensation is effected in the upper part or capital, and sometimes in a retort with a very short and wide neck, to which a conical receiver is fitted. The heat is most commonly applied through the medium of a sand-bath; and the degree of heat, and the depth to which the vessel is inserted in it, are regulated by the nature of the sublimation.

542. *Congelation* is the reduction of a fluid into a solid form, in consequence of the abstraction of caloric. The means employed for abstracting caloric are the evaporation of volatile fluids, the solution of solids, and the contact of cold bodies.

543. *Coagulation* is the conversion of a fluid into a solid of greater or less consistence, merely in consequence of a new arrangement of its particles, as during the process there is no separation of caloric or any other substance. The means of producing coagulation are, increase of temperature, and the addition of certain substances, as acids and runnets.

### COMBINATION.

544. Chemical combination is the intimate union of the particles of at least two heterogeneous bodies. It is the effect resulting from the exertion of the attraction of affinity, and is therefore subjected to all the laws of affinity.

545. To produce the chemical union of any bodies it is necessary,

1. That they possess affinity for each other;
2. That their particles come into actual contact;
3. That the strength of the affinity be greater than any counteracting causes which may be present.

546. The principal counteracting causes are,

1. The attraction of aggregation ;
2. Affinities for other substances.

547. The means to be employed for overcoming the action of other affinities will be treated of under Decomposition.

548. The attraction of aggregation is overcome by means of

1. Mechanical division.
2. The action of caloric.

549. Combination is facilitated by increasing the points of actual contact.

1. By mechanical agitation ;
2. By condensation ; compression.

550. The processes employed for producing combination may be considered,

1. With regard to the nature of the substances combined ; and,
2. To the nature of the compound produced.

Gases,

1. Combine with gases ;
2. Dissolve fluids or solids ;
3. Or are absorbed by them.

Fluids,

1. Are dissolved in gases ;
2. Or absorb them ;
3. Combine with fluids ;
4. And dissolve solids ;
5. Or are rendered solid by them.

Solids,

1. Are dissolved in fluids and in gases ; or,
2. Absorb gases ;
3. And solidify fluids.

551. The combination of gases with each other, in some instances, takes place when simply mixed together : thus nitrous and oxygen gases combine as soon as they come into contact ; in other instances, it is necessary to elevate their temperature to a degree sufficient for their inflammation, either by means of the electric spark, or the contact of an ignited body, as in the combination of oxygen gas with hydrogen or nitrogen gas.

552. When gases combine with each other, there is always a considerable diminution of bulk, and not unfrequently they are condensed into a liquid or solid form. Hydrogen and oxygen gases form water: muriatic acid and ammonia gases form solid muriate of ammonia. But when the combination is effected by ignition, a violent expansion, which endangers the bursting of the vessels, previously takes place, in consequence of the increase of temperature.

553. *Solution* is the diminution of aggregation in any solid or fluid substance, in consequence of its entering into chemical combination. The substance, whether solid or fluid, whose aggregation is lessened, is termed the *Solvend;* and the substance, by whose agency the solution is effected, is often called the *Menstruum* or *Solvent.*

554. Solution is said to be performed *via humida*, when the natural form of the solvent is fluid; but when the agency of heat is necessary to give the solvent its fluid form, the solution is said to be performed *via sicca.*

555. The dissolving power of each menstruum is limited, and is determinate with regard to each solvend. The solubility of bodies is also limited and determinate with regard to each menstruum.

556. When any menstruum has dissolved the greatest possible quantity of any solvend, it is said to be saturated with it. But in some cases, although saturated with one substance, it is still capable of dissolving others. Thus a saturated solution of muriate of soda will dissolve a certain quantity of nitrate of potass, and after that a portion of muriate of ammonia.

557. The dissolving power of solvents, and consequently the solubility of solvends, are generally increased by increase of temperature; and conversely, this power is diminished by diminution of temperature; so that, from a saturated solution, a separation of a portion of the solvend generally takes place on any reduction of temperature. This property becomes extremely useful in many chemical operations, especially in crystallization.

558. Particular terms have been applied to particular cases of solution.

559. The solution of a fluid in the atmosphere is termed *spontaneous evaporation.* It is promoted by exposing a large surface, by frequently renewing the air in contact with the surface, and by increase of temperature.

560. Some solids have so strong an affinity for water, that they attract it from the atmosphere in sufficient quantity to dissolve them. These are said to *deliquesce.* Others, on the

contrary, retain their water of crystallization with so weak a force, that the atmosphere attracts it from them, so that they crumble into powder. These are said to *effloresce.* Both operations are promoted by exposing large surfaces, and by a current of air; but the latter is facilitated by a warm dry air, and the former by a cold humid atmosphere.

561. Solution is also employed to separate substances (for example, saline bodies,) which are soluble in the menstruum, from others which are not. When our object is to obtain the soluble substance in a state of purity, the operation is termed *lixiviation.* In this as small a quantity of the menstruum as is possible is used. When, however, solution is employed to free an insoluble substance from soluble impurities, it is termed *edulcoration*, which is best performed by using a very large quantity of the menstruum.

562. Organic products being generally composed of heterogeneous substances, are only partially soluble in the different menstrua. To the solution of any of these substances, while the others remain undissolved, the term *extraction* is applied; and when, by evaporation, the substance extracted is reduced to a solid form, it is termed an Extract, which is hard or soft, watery or spiritous, according to the degree of consistency it acquires, and the nature of the menstruum employed.

563. *Infusion* is employed to extract the virtues of aromatic and volatile substances, which would be dissipated by decoction, and destroyed by maceration, and to separate substances of easy solution from others which are less soluble. The process consists in pouring upon the substance to be infused, placed in a proper vessel, the menstruum, either hot or cold, according to the direction, covering it up, agitating it frequently, and after a due time straining or decanting off the liquor, which is then termed the Infusion.

564. *Maceration* differs from infusion, it being continued for a longer time, and can only be employed for substances which do not easily ferment or spoil.

565. *Digestion*, on the other hand, differs from maceration only in the activity of the menstruum being promoted by a gentle degree of heat. It is commonly performed in a glass matrass, which should only be filled one-third, and covered with a piece of wet bladder, pierced with one or more small holes, so that the evaporation of the menstruum may be prevented as much as possible, without risk of bursting the vessel. The vessel may be heated, either by means of the sun's rays, of a common fire, or of the sand-bath; and when the last is employed, the vessel should not be sunk deeper in the

sand than the portion that is filled. Sometimes, when the menstruum employed is valuable, a distilling apparatus is used to prevent any waste of it. At other times, a blind capital is luted on the matrass, or a smaller matrass is inverted within a larger one; and as the vapour which arises is condensed in it, and runs back into the larger, the process in this form has got the name of *Circulation.*

566. *Decoction* is performed by subjecting the substances operated on to a degree of heat, which is sufficient to convert the menstruum into vapour, and can only be employed with advantage for extracting principles which are not volatile, and from substances whose texture is so dense and compact as to resist the less active methods of solution. When the menstruum is valuable, that portion of it which is converted into vapour is generally saved by condensing it in a distilling apparatus.

567. Solutions in alcohol are termed Tinctures, and in vinegar or wine, Medicated vinegars or wines. The solution of metals in mercury is termed Amalgamation. The combinations of other metals with each other form Alloys.

568. *Absorption* is the condensation of a gas into a fluid or solid form, in consequence of its combination with a fluid or solid. It is facilitated by increase of surface and agitation; and the power of absorption in fluids is much increased by compression and diminution of temperature, although in every instance it be limited and determinate. Dr Nooth invented an ingenious apparatus for combining gases with fluids; and Messrs Schweppe, Henry, Paul, and Cuthbertson, have very advantageously employed compression.

569. *Consolidation.* Fluids often become solid by entering into combination with solids; and this change is always accompanied by considerable increase of temperature, as in the slaking of lime.

### DECOMPOSITION.

570. *Decomposition* is the separation of bodies which were chemically combined.

571. It can only be effected by the agency of substances possessing a stronger affinity for one or more of the constituents of the compound, than these possess for each other.

572. Decomposition has acquired various appellations, according to the phenomena which accompany it.

573. *Dissolution* differs from solution in being accompanied by the decomposition, or a change in the nature of the substance dissolved. Thus, we correctly say, a solution of lime

in muriatic acid, and a dissolution of chalk in muriatic acid.

474. Sometimes a gas is separated during the action of bodies on each other. When this escapes with considerable violence and agitation of the fluid it is termed *effervescence.* The gas is very frequently allowed to escape into the atmosphere, but at other times is either collected in a pneumatic apparatus, or made to enter into some new combination.—The vessels in which an effervescing mixture is made, should be high and sufficiently large, to prevent any loss of the materials from their running over; and in some cases the mixture must be made slowly and gradually.

575. *Precipitation* is the reverse of solution. It comprehends all those processes in which a solid is obtained by the decomposition of a solution. The substance separated is termed a Precipitate, if it sink to the bottom of the fluid; or a Cream, if it swim above it. Precipitation, like solution, is performed either *via humida*, or *via sicca.*

576. The objects of precipitation are,

1. The separation of substances from solutions in which they are contained;
2. The purification of solutions from precipitable impurities;
3. The formation of new combinations.

577. Precipitation is effected,

1. By lessening the quantity of the solvent by evaporation;
2. By diminishing its solvent power, as by reduction of temperature, or dilution;
3. Or by the addition of some chemical agent, which from its more powerful affinities,
   - *a.* Either combines with the solvent, and precipitates the solvend,
   - *b.* Or forms itself an insoluble compound with some constituent of the solution.

578. The two first means of precipitation have been already noticed. Indeed they are rarely considered as instances of precipitation, as the effect is gradual, and the precipitated matter most commonly assumes determinate figures.

579. In performing it in the last manner, we may observe the following rules:

1. The solution and precipitant must possess the requisite degree of purity.
2. The solution should be perfectly saturated, to avoid unnecessary consumption of the solvent or precipitant.
3. The one is to be added slowly and gradually to the other.

4. After each addition, they are to be thoroughly mixed by agitation.
5. We must allow the mixture to settle, after we think that enough of the precipitant has been added, and try a little of the clear solution, by adding to it some of the precipitant: if any precipitation takes place, we have not added enough of the precipitant. This precaution is necessary, not only to avoid loss, but, in many instances, the precipitant, if added in excess, redissolves, or combines with the precipitate.

580. After the precipitation is completed, the precipitate is to be separated from the supernatant fluid by some of the means already noticed.

581. When the precipitate is the chief object of our process, and when it is not soluble in water, it is often advisable to dilute, to a considerable degree, both the solution and precipitant, before performing the operation. When it is only difficultly soluble, we must content ourselves with washing the precipitate, after it is separated by filtration. In some cases, the separation of the precipitate is much assisted by a gentle heat.

582. *Crystallization* is a species of precipitation, in which the particles of the solvend, on separating from the solution, assume certain determinate forms.

583. The conditions necessary for crystallization are,

1. That the integrant particles have a tendency to arrange themselves in a determinate manner when acted on by the attraction of aggregation;
2. That they be disaggregated, at least so far as to possess sufficient mobility to assume their peculiar arrangement;
3. That the causes disaggregating them be slowly and gradually removed.

584. Notwithstanding the immense variety in the forms of crystals, M. Hauy has rendered it probable that there are only three forms of the integrant particles:

1. The parallelopiped.
2. The triangular prism.
3. The tetrahedron.

585. But as these particles may unite in different ways, either by their faces or edges, they will compose crystals of various forms.

586. The primitive forms have been reduced to six.

1. The parallelopiped.
2. The regular tetrahedron.
3. The octohedron, with triangular faces.
4. The six-sided prism.
5. The dodecahedron terminated by rhombs.
6. The dodecahedron with isosceles triangular faces.

587. Almost all substances, on crystallizing, retain a portion of water combined with them, which is essential to their existence as crystals, and is therefore denominated water of crystallization. Its quantity varies very much in different crystallized substances.

588. The means by which the particles of bodies are disaggregated, so as to admit of crystallization, are solution, fusion, vaporization, or mechanical division and suspension in a fluid medium.

589. The means by which the disaggregating causes are removed, are, evaporation, reduction of temperature, and rest.

590. When bodies are merely suspended in a state of extreme mechanical division, nothing but rest is necessary for their crystallization.

591. When they are disaggregated by fusion or vaporization, the regularity of their crystals depends on the slowness with which their temperature is reduced; for if cooled too quickly, their particles have not time to arrange themselves, and are converted at once into a confused or unvaried solid mass. Thus glass, which, when cooled quickly, is so perfectly uniform in its appearance, when cooled slowly, has a crystalline texture. But in order to obtain crystals by means of fusion, it is often necessary, after the substance has begun to crystallize, to remove the part which remains fluid; for otherwise it would fill up the interstices among the crystals first formed, and give the whole the appearance of one solid mass. Thus, after a crust has formed on the top of melted sulphur, by drawing out the still fluid part, we obtain regular crystals.

592. The means by which bodies, which have been disaggregated by solution, are made to crystallize more regularly, vary according to the habitudes of the bodies with their solvents and caloric.

593. Some saline substances are much more soluble in hot than in cold water; therefore, a boiling saturated solution of any of these will deposite, on cooling, the excess of salt, which it is unable to dissolve when cold. These salts commonly contain much water of crystallization.

594. Other salts are scarcely, if at all, more soluble in hot than in cold water; and therefore their solutions must be evaporated, either by heat, or spontaneously. These salts commonly contain little water of crystallization.

595. The beauty and size of the crystals depend upon the purity of the solution, its quantity, and the mode of conducting the evaporation and cooling.

596. When the salt is not more soluble in hot than in cold water, by means of gentle evaporation, a succession of pellicles is formed on the top of the solution, which either are removed, or permitted to sink to the bottom by their own weight; and the evaporation is continued until the crystallization be completed.

597. But when the salt is capable of crystallizing on cooling, the evaporation is only continued until a drop of the solution, placed upon some cold body, shews a disposition to crystallize, or at farthest only until the first appearance of a pellicle. The solution is then covered up, and set aside to cool; and the more slowly it cools, the more regular are the crystals. The mother water, or solution which remains after the crystals are formed, may be repeatedly treated in the same way as long as it is capable of furnishing any more salt.

598. When very large and beautiful crystals are wanted, they may be obtained by laying well-formed crystals in a saturated solution of the same salt, and turning them every day. In this way their size may be considerably increased, though not without limitation; for after a certain time, they grow smaller instead of larger.

599. Crystallization is employed,

1. To obtain crystallizable substances in a state of purity;
2. To separate them from each other, by taking advantage of their different solubility at different temperatures.

### OXYGENIZEMENT.

600. The combination of oxygen is the object of many chemical and pharmaceutical processes.

601. With regard to the manner of combination, the oxygenizement may take place, either,

*a.* Without the production of heat and light, to express which there is no other than the generic term *oxygenizement;* or,

*b.* With the production of heat and light; *combustion.*

1. In substances which remain fixed at the tempe-

rature necessary for their combustion, there is no other more specific term;

2. In substances which exist as gases, or are previously reduced to the state of vapour by the temperature necessary, it is termed *inflammation*; and if it proceed with very great violence and rapidity, *deflagration*.

602. Combustion and inflammation have been already described.

603. *Deflagration*, from its violence, must always be performed with caution. The common mode of conducting this process is, to introduce the substances to be deflagrated together into any convenient vessel, commonly an iron pot, or crucible, heated to redness. But to obviate any inconvenience, and to insure the success of the process, they are previously made perfectly dry, reduced to powder, and thoroughly mixed together. The compound is then deflagrated gradually, generally by spoonfuls; but we must take care always to examine the spoon, lest a spark should adhere to it, which might set fire to the whole mass. During the process, the portion introduced should be frequently stirred.

604. The oxygen necessary for the process of oxygenation may be derived from the decomposition,

*a*. Of oxygen gas, or atmospheric air;
*b*. Of oxides, particularly water;
*c*. Of acids and their combinations.

605. The different modes of oxygenizement are intended, either,

*a*. To produce heat and light;
*b*. To obtain an oxygenized product;
  1. An oxide, when the process may be termed *Oxidizement*.
  2. An acid, *Acidification*.
*c*. To remove an oxygenizable substance.

606. Hydrogen, carbon, and nitrogen, are never, unless for experiment, oxygenized as simple substances.

607. Sulphur is converted into sulphuric acid by burning it in leaden chambers, or by deflagating it with nitrate of potass: and phosphorus is acidified by inflammation in the atmosphere.

608. Of all the simple oxygenizable substances, the metals are most frequently combined with oxygen; and, as in conse-

quence of this combination, they lose their metallic appearance, they were formerly said to be calcined or corroded.

609. Metals differ very much in the facility with which they are oxygenized by the contact of oxygen gas. For some, as iron and manganese, the ordinary temperature of the atmosphere is necessary; but others, as potassium and sodium, are oxygenized even by the contact of ice: while others, as gold, and platinum, scarcely undergo any change in the most violent heat. Upon these the operation is performed by heating them to the requisite temperature, and exposing them to the action of the air: and on the fusible metals it is promoted by stirring them when melted.

610. Metals also differ in the mode of their action upon water. They are either capable of decomposing water,

*a.* At every temperature, as potassium and sodium.
*b.* At ordinary temperatures, as iron, zinc, manganese, &c.
*c.* At elevated temperatures, as antimony and tin; or
*d.* When acted upon at the same time by an acid or an alkali, as copper, lead, bismuth; or, lastly,
*e.* They are incapable of decomposing it, as gold, silver, mercury, platinum.

611. The oxygenizement of metals by water is promoted by the action of air. Iron, for example, is more quickly rusted by being merely moistened with water, than when totally immersed in water.

612. But the acids are the most powerful agents in oxygenizing metals. They act, in two ways, either,

1. By enabling them to decompose water.
2. By being decomposed themselves.

613. The metals are susceptible of different degrees of oxygenizement, some of them even of acidification, aud, in general, they are more oxygenized according to the rapidity of the process When proceeding too slowly, it may be accelerated by heat; when too violent, it must be checked by diminution of temperature, as by plunging the vessel in which the operation is performed into cold water.

614. When the degree of oxygenizement is not very great the oxide formed generally enters into combination with the acid employed, and forms a metallic salt; but when carried to its highest degree, the oxide is often insoluble.

### DISOXYGENIZEMENT OF METALLIC OXIDES AND ACIDS.

615. This process was formerly termed *reduction*, from its restoring the metals to their metallic splendour, and is per-

formed by causing some body to act upon them, which has a greater affinity for oxygen than they have. The different metals themselves vary very much in the degree of this affinity, so that they are reduced with very different degrees of facility. Gold, silver, platinum, and mercury, are reduced by merely exposing them to a sufficient degree of heat in close vessels. The oxygen at this temperature has a greater affinity for caloric than for the metals, and is therefore driven off in the form of very pure oxygen gas.

616. Some other metallic oxides which resist the simple action of heat, may be reduced by melting them in contact with charcoal, or substances which may be charred, such as oil, fat, resin, pitch, &c. Besides the charcoal, different saline fluxes are also added to facilitate the fusion of the oxide.

617. The oxide to be reduced is mixed with a sufficient quantity of any of these substances, and placed in the bottom of a crucible, which is afterwards filled up with charcoal powder, to prevent entirely the access of the air, and exposed for a length of time to a sufficiently high temperature, when a button of the metal will commonly be found in the bottom of the crucible. Upon the volatile metals, such as arsenic and zinc, this operation must be performed in a distilling or subliming apparatus. Some metallic oxides, such as those of platinum, columbium, &c. cannot be reduced, from our being unable to produce a degree of heat sufficient to melt them.

618. But galvanism is by far the most powerful disoxygenizing process. By means of it the metallic bases of the alkalies and earths have been discovered.

619. Metals may be also obtained from the metallic salts, by inserting in a solution of these a plate of another metal, possessing a stronger affinity for oxygen than for the acid. Thus copper is precipitated by iron, and arsenic by zinc. We must only take care that the two metals have no remarkable affinity for each other, as in that case an alloy is commonly produced. For example, when mercury is placed in a solution of silver, a crystallized amalgam of silver is obtained, formerly called the Arbor Dianæ.

620. The compound oxides, (vegetable and animal substances,) may be further oxygenized, by treating them with nitric acid. In this way various oxides and acids are formed, according to the nature of the oxide operated on, the quantity of the acid, and the mode of conducting the process.

621. These substances also undergo changes by gradually combining with the oxygen of the atmosphere. In some cases, this combination is attended with remarkable phenomena, which have been classed under the term *fermentation.*

622. There are several species of fermentation, which have been named from the products they afford,

1. The saccharine, which produces sugar.
2. The vinous, which produces wine, beer, and similar fluids.
3. The panary, which produces bread.
4. The acetous, which produces vinegar.
5. The putrefactive, which produces ammonia.

623. The same substances are sometimes capable of undergoing the first, second, fourth, and fifth; or third, fourth, and fifth successively, but never in a retrograde order.

624. The conditions necessary for all of them are,

1. The presence of a sufficient quantity of fermentable matter;
2. The presence of a certain proportion of water;
3. The contact of atmospheric air; and,
4. A certain temperature.

625. *The saccharine fermentation.*—The seeds of barley, when moistened with a certain quantity of water, and exposed to the contact of the atmospheric air, at a temperature of not less than 50°, swell, and shew marks of incipient vegetation, by pushing forth the radicle. If at this period the fermentation be checked, by exposing them to a considerable degree of heat and drying them thoroughly, the insipid amylaceous matter, of which the seeds principally consisted, will be found to be changed in part into a sweet saccharine substance. The oxygen of the air, in contact with the seeds, is at the same time converted into carbonic acid gas, by combining with part of the carbon of the seeds; and there is a considerable increase of temperature in the fermenting mass, even to such a degree as sometimes to set it on fire. Similar phenomena occur in the maturation of fruits; in the cookery of some roots and fruits, and during the heating of hay, when put up too wet.

626. *The vinous fermentation.*—The conditions necessary for the vinous fermentation, are, the presence of proper proportions of sugar, acid, extract, and water, and a temperature of about 70°. When these circumstances exist, an intestine motion commences in the fluid; it becomes thick and muddy, its temperature increases, and carbonic acid gas is evolved. After a time the fermentation ceases, the feces rise to the top, or subside to the bottom, the liquor becomes clear, it has lost its saccharine taste, and assumed a new one, and its specific gravity is diminished. If the fermentation has been com-

plete, the sugar is entirely decomposed, and the fermented liquor consists of a large proportion of water, of alcohol, of malic acid, of extract, of essential oil, and colouring matter. The substances most commonly subjected to this fermentation are must, which is the expressed juice of the grape, and which produces the best wines; the juice of the currant and gooseberry, which, with the addition of sugar, form our home made wines; the juices of the apple and pear, which give cyder and perry; and an infusion of malt, which, when fermented with yeast, forms beer. The briskness and sparkling of some of these liquors depend on their being put into close vessels before the fermentation is completed, by which means a portion of carbonic acid gas is retained.

627. *The acetous fermentation.*—All vinous liquors are susceptible of the acetous fermentation, provided they be exposed to the action of the atmosphere, in a temperature not less than 70°. An intestine motion and hissing noise sensibly takes place in the fluid; it becomes turbid, with filaments floating in it, and its temperature increases; it exhales a pungent acid smell, without any disengagement of carbonic acid gas. Gradually these phenomena cease; the temperature decreases, the motion subsides, and the liquor becomes clear, having deposited a sediment and red glairy matter, which adheres to the sides of the vessel. During this process, the alcohol and malic acid disappear entirely, oxygen is absorbed, and acetous acid formed.

628. *The panary and colouring fermentation.*—is less understood than those already described. A paste of wheat-flour and water, exposed to a temperature of 65°, swells, emits a small quantity of gas, and acquires new properties. The gluten disappears, and the paste acquires a sour disagreeable taste. If a just proportion of this fermented paste or leaven, or, what is still better, if some barm, be formed into a paste with wheat flour and water, the same fermentation is excited, without the disagreeable taste being produced; the gas evolved is prevented from escaping by the viscidity of the paste, which therefore swells, and if baked, forms light spongy bread.

629. *The putrefactive fermentation.*—Although vegetable substances, when they are destroyed by spontaneous decomposition, are said to putrefy, we shall consider this fermentation as belonging exclusively to animal substances, or those which contain nitrogen as an elementary principle. The essential conditions of putrefaction are humidity, and a temperature between 45° and 110°. The presence of air, the diminution of pressure, and the addition of ferments are not essential, but

accelerate its progress. The smell is at first vapid and disagreeable, but afterwards insupportably fetid, although the fetor, for a time, is somewhat diminished by the mixture of an ammoniacal odour. Liquids become turbid and flocculent. Soft substances melt down into a gelatinous mass, in which there is a kind of gentle motion and swelling up, from the slow and scanty formation of elastic fluids. Solids, beside the general softening, exude a serosity of various colours, and by degrees the whole mass dissolves, the swelling ceases, the matter settles, and its colour deepens; at last its odour becomes somewhat aromatic, its elements are finally dissipated, and there remains only a kind of fat, viscid, and still fetid mould. The products of putrefaction are carburetted, sulphuretted, and phosphuretted hydrogen gases, water, ammonia, azote, and carbonic acid. These are all dissipated in the form of gas or vapour When in contact with air, oxygen is absorbed. Acetic acid, a fatty matter, a soap composed of this fat and ammonia, and often the nitric acid, fixed by a salifiable base, are also produced; and the ultimate remains, besides salts, composed of acid and earths, contain for a long time a portion of fat charry matter.

# APPENDIX.

## WEIGHTS AND MEASURES.

### ENGLISH.

#### APOTHECARIES WEIGHT, L.

| *Pound.* | | *Ounces.* | | *Drams.* | | *Scruples.* | | *Grains.* | | *Grammes.* |
|---|---|---|---|---|---|---|---|---|---|---|
| ℔ 1 | = | 12 | = | 96 | = | 288 | = | 5760 | = | 372.96 |
| | | ℥ 1 | = | 8 | = | 24 | = | 480 | = | 31.08 |
| | | | | ʒ 1 | = | 3 | = | 60 | = | 3.885 |
| | | | | | | ℈ 1 | = | 20 | = | 1.295 |
| | | | | | | | | gr. 1 | = | 0.06475 |

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*Table for converting Ounces, Drams, and Grains Troy into Decimals of the Troy Pound.*

| *Grain.* | *lbs. Troy.* | *Dram.* | *lbs. Troy.* | *Oz.* | *lbs. Troy.* |
|---|---|---|---|---|---|
| 1 = | $.00017361\dot{1}$ | 1 = | $.010416\dot{6}$ | 1 = | $.083\dot{3}$ |
| 2 = | $.00034722\dot{2}$ | 2 = | $.020833\dot{3}$ | 2 = | $.166\dot{6}$ |
| 3 = | $.00052083\dot{3}$ | 3 = | $.031250\dot{0}$ | 3 = | $.250\dot{0}$ |
| 4 = | $.00069444\dot{4}$ | 4 = | $.041666\dot{6}$ | 4 = | $.333\dot{3}$ |
| 5 = | $.00086805\dot{5}$ | 5 = | $.052083\dot{3}$ | 5 = | $.416\dot{6}$ |
| 6 = | $.00104166\dot{6}$ | 6 = | $.062500\dot{0}$ | 6 = | $.500\dot{0}$ |
| 7 = | $.00121527\dot{7}$ | 7 = | $.072916\dot{6}$ | 7 = | $.583\dot{3}$ |
| 8 = | $.00138888\dot{8}$ | | | 8 = | $.666\dot{6}$ |
| 9 = | $.00156250\dot{0}$ | | | 9 = | $.750\dot{0}$ |
| | | | | 10 = | $.833\dot{3}$ |
| | | | | 11 = | $.916\dot{6}$ |

*Table for converting Decimals of the Troy Pound into Troy Ounces, Drams, and Grains.*

| lb. | | oz. | dr. | grs. | lb. | | oz. | dr. | grs. | lbs. | | grains. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .1 | = | 1 | 1 | 36 | .01 | = | 0 | 0 | 57.6 | .001 | = | 5.76 |
| .2 | = | 2 | 3 | 12 | .02 | = | 0 | 1 | 55.2 | .002 | = | 11.52 |
| .3 | = | 3 | 4 | 48 | .03 | = | 0 | 2 | 52.8 | .003 | = | 17.28 |
| .4 | = | 4 | 6 | 24 | .04 | = | 0 | 3 | 50.4 | .004 | = | 23.04 |
| .5 | = | 6 | 0 | 0 | .05 | = | 0 | 4 | 48.0 | .005 | = | 28.80 |
| .6 | = | 7 | 1 | 36 | .06 | = | 0 | 5 | 45.6 | .006 | = | 34.56 |
| .7 | = | 8 | 3 | 12 | .07 | = | 0 | 6 | 43.2 | . 07 | = | 40.32 |
| .8 | = | 9 | 4 | 48 | .08 | = | 0 | 7 | 40.8 | .008 | = | 46.08 |
| .9 | = | 10 | 6 | 24 | .09 | = | 0 | 8 | 38.4 | .009 | = | 51.84 |

AVOIR UPOIS WEIGHT.

| *Pounds.* | | *Ounces.* | | *Drams.* | | *Troy Grains.* | | *Grammes.* |
|---|---|---|---|---|---|---|---|---|
| 1 | = | 16 | = | 256 | = | 7000 | = | 4 3.25 |
| | | 1 | = | 16 | = | 437.5 | = | 28 32 |
| | | | | 1 | = | 7.34375 | = | 1.81 |

*Table for converting Avoirdupois Ounces into Decimals of the Avoirdupois Pound.*

| oz. Av. | | lbs. Av. | oz. Av. | | lbs. Av. |
|---|---|---|---|---|---|
| .25 | = | .015625 | 8.00 | = | .5000 |
| .50 | = | .03125 | 9.00 | = | .5625 |
| 1.00 | = | .0625 | 10.00 | = | .6250 |
| 2.00 | = | .1250 | 11.00 | = | .6875 |
| 3.00 | = | .1875 | 12.00 | = | .7500 |
| 4.00 | = | .2500 | 13 0 | = | .8125 |
| 5.00 | = | .3125 | 14.00 | = | .8750 |
| 6.00 | = | .3750 | 15.00 | = | .9375 |
| 7.00 | = | .4375 | | | |

*Table for converting Decimals of the Avoirdupois Pound into Avoirdupois Ounces and Decimals.*

| lbs. Av. | | oz. Av. | lbs. Av. | | oz. Av. |
|---|---|---|---|---|---|
| .1 | = | 1.6 | .01 | = | .16 |
| .2 | = | 3.2 | .02 | = | .32 |
| .3 | = | 4.8 | .03 | = | .48 |
| .4 | = | 6.4 | .04 | = | .64 |
| .5 | = | 8.0 | .05 | = | .80 |
| .6 | = | 9.6 | .06 | = | .96 |
| .7 | = | 11.2 | .07 | = | 1.12 |
| .8 | = | 12.8 | .08 | = | 1.28 |
| .9 | = | 14.44 | .09 | = | 1.44 |

### *Table for converting Troy Pounds into their equivalent Avoirdupois Pounds.*

| *lbs. Troy.* | | *lbs. Avoirdup.* | *lbs. Troy.* | | *lbs. Avoirdup.* |
|---|---|---|---|---|---|
| 1 | = | 0.82285714 | 6 | = | 4.93714285 |
| 2 | = | 1.64571428 | 7 | = | 5.76000000 |
| 3 | = | 2.46857142 | 8 | = | 6.58285714 |
| 4 | = | 3.29142857 | 9 | = | 7.40571428 |
| 5 | = | 4.11428571 | | | |

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### *Table expressing the relative Weight in Avoirdupois of various Weights Troy.*

| TROY. *dr.* | | AVOIRDUPOIS. *dr.* | *gr.* | TROY. *dr.* | | AVOIRDUPOIS. *dr* | *gr.* |
|---|---|---|---|---|---|---|---|
| 1 | = | 2 : | 5.3125 | 5 | = | 10 : | 26.5625 |
| 2 | = | 4 : | 10.625 | 6 | = | 13 : | 4.53125 |
| 3 | = | 6 : | 15.9375 | 7 | = | 15 : | 9.84375 |
| 4 | = | 8 : | 21.25 | 8 | = | 17 : | 15.15625 |

| TROY. *oz.* | | AVOIRDUPOIS. *oz.* | *gr.* | TROY. *oz.* | | AVOIRDUPOIS. *oz.* | *gr.* |
|---|---|---|---|---|---|---|---|
| 1 | = | 1 : | 42.5 | 7 | = | 7 : | 297.5 |
| 2 | = | 2 : | 85. | 8 | = | 8 : | 340. |
| 3 | = | 3 : | 127.5 | 9 | = | 9 : | 382.5 |
| 4 | = | 4 : | 170. | 10 | = | 10 : | 425. |
| 5 | = | 5 : | 212.5 | 11 | = | 12 : | 30. |
| 6 | = | 6 : | 255. | 12 | = | 13 : | 72.5 |

| TROY. *lb.* | | AVOIRDUPOIS. *lb.* | *oz.* | *gr.* | TROY. *lb.* | | AVOIRDUPOIS. *lb.* | *oz.* | *gr.* |
|---|---|---|---|---|---|---|---|---|---|
| 1 | = | 0 | 13 | 72.5 | 17 | = | 13 | 15 | 359.5 |
| 2 | = | 1 | 10 | 145 | 18 | = | 14 | 12 | 430 |
| 3 | = | 2 | 7 | 217.5 | 19 | = | 15 | 10 | 65 |
| 4 | = | 3 | 4 | 290 | 20 | = | 16 | 7 | 137.5 |
| 5 | = | 4 | 1 | 362.5 | 30 | = | 24 | 10 | 425 |
| 6 | = | 4 | 14 | 435 | 40 | = | 32 | 14 | 275 |
| 7 | = | 5 | 12 | 70 | 50 | = | 41 | 2 | 125 |
| 8 | = | 6 | 9 | 142.5 | 60 | = | 49 | 5 | 412.5 |
| 9 | = | 7 | 6 | 215 | 70 | = | 57 | 9 | 262.5 |
| 10 | = | 8 | 3 | 287.5 | 80 | = | 65 | 13 | 112.5 |
| 11 | = | 8 | 0 | 360 | 90 | = | 74 | 0 | 400 |
| 12 | = | 9 | 13 | 432.5 | 100 | = | 82 | 4 | 250 |
| 13 | = | 10 | 11 | 67.5 | 200 | = | 164 | 9 | 62.5 |
| 14 | = | 11 | 8 | 140 | 300 | = | 246 | 13 | 312.5 |
| 15 | = | 12 | 5 | 212.5 | 400 | = | 293 | 2 | 125 |
| 16 | = | 13 | 2 | 285 | 500 | = | 411 | 6 | 375 |

## *Table for converting Avoirdupois Pounds into their equivalent Troy Pounds.*

| lbs. Avoird. | | lbs. Troy. |
|---|---|---|
| 1 | = | 1.215277 |
| 2 | = | 2.430555 |
| 3 | = | 3.645833 |
| 4 | = | 4.861111 |
| 5 | = | 6.076388 |
| 6 | = | 7.291666 |
| 7 | = | 8.506944 |
| 8 | = | 9.722222 |
| 9 | = | 10.937500 |

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## *Table expressing the relative value in Troy Weight of various Weights Avoirdupois.*

| AVOIRDUPOIS. dr. | | TROY. dr. | gr. |
|---|---|---|---|
| 1 | = | 0 | 27.34375 |
| 2 | = | 0 | 54.68750 |
| 3 | = | 1 | 22.03125 |
| 4 | = | 1 | 49.37500 |
| 5 | = | 2 | 16.71875 |
| 6 | = | 2 | 44.06250 |
| 7 | = | 3 | 11.40625 |
| 8 | = | 3 | 38.75000 |
| 9 | = | 4 | 6.09375 |
| 10 | = | 4 | 33.43750 |
| 11 | = | 5 | 00.78125 |
| 12 | = | 5 | 28.13500 |
| 13 | = | 5 | 55.46875 |
| 14 | = | 6 | 22.81250 |
| 15 | = | 6 | 50.15625 |
| 16 | = | 7 | 17.50000 |

| AVOIRDUPOIS. oz. | | TROY. oz. | dr. | gr. |
|---|---|---|---|---|
| 1 | = | 0 : | 7 : | 17.5 |
| 2 | = | 1 : | 6 : | 35 |
| 3 | = | 2 : | 5 : | 52.5 |
| 4 | = | 3 : | 5 : | 10 |
| 5 | = | 4 : | 4 : | 27.5 |
| 6 | = | 5 : | 3 : | 55 |
| 7 | = | 6 : | 3 : | 2.5 |
| 8 | = | 7 : | 2 : | 20 |
| 9 | = | 8 : | 1 : | 37.5 |
| 10 | = | 9 : | 0 : | 55 |
| 11 | = | 10 : | 0 : | 22.5 |
| 12 | = | 10 : | 7 : | 50 |
| 13 | = | 11 : | 6 : | 57.5 |
| 14 | = | 12 : | 6 : | 5 |
| 15 | = | 13 : | 5 : | 22.5 |
| 16 | = | 14 : | 4 : | 40 |

| AVOIRDUPOIS. lb. | | TROY. lb. | oz. | dr. | gr. |
|---|---|---|---|---|---|
| 1 | = | 1 | 2 | 4 | 40 |
| 2 | = | 2 | 5 | 1 | 20 |
| 3 | = | 3 | 7 | 6 | 00 |
| 4 | = | 4 | 10 | 2 | 40 |
| 5 | = | 6 | 0 | 7 | 20 |
| 6 | = | 7 | 3 | 4 | 00 |
| 7 | = | 8 | 6 | 0 | 40 |
| 8 | = | 9 | 8 | 5 | 20 |
| 9 | = | 10 | 11 | 2 | 00 |
| 10 | = | 12 | 1 | 6 | 40 |
| 11 | = | 13 | 4 | 3 | 20 |
| 12 | = | 14 | 7 | 0 | 00 |
| 13 | = | 15 | 9 | 4 | 40 |
| 14 | = | 17 | 0 | 1 | 20 |
| 15 | = | 18 | 2 | 6 | 00 |
| 16 | = | 19 | 5 | 2 | 40 |

| AVOIRDUPOIS. lb. | | TROY. lb. | oz. | dr. | gr. |
|---|---|---|---|---|---|
| 17 | = | 20 | 7 | 7 | 20 |
| 18 | = | 21 | 10 | 4 | 00 |
| 19 | = | 23 | 1 | 0 | 40 |
| 20 | = | 24 | 3 | 5 | 20 |
| 30 | = | 36 | 5 | 4 | 00 |
| 40 | = | 48 | 7 | 2 | 40 |
| 50 | = | 60 | 9 | 1 | 20 |
| 60 | = | 72 | 11 | 0 | 00 |
| 70 | = | 85 | 0 | 6 | 40 |
| 80 | = | 97 | 2 | 5 | 20 |
| 90 | = | 109 | 4 | 4 | 00 |
| 100 | = | 121 | 6 | 2 | 40 |
| 200 | = | 243 | 0 | 5 | 20 |
| 300 | = | 364 | 7 | 0 | 00 |
| 400 | = | 486 | 1 | 2 | 40 |
| 500 | = | 607 | 7 | 5 | 20 |

MEASURE, LONDON PHARMACOPŒIA.

| *Gal.* | *Pints.* | *Fluidoun.* | *Fluidr.* | *Minims.* | *Troy Gr.* | *Cub. Inch.* | *Litres.* |
|---|---|---|---|---|---|---|---|
| 1 = | 8 = | 128 = | 1024 = | 61440 = | 58443 = | 231 = | 3.78515 |
| | O 1 = | 16 = | 128 = | 7680 = | 7305 = | 28.875 = | 0.47398 |
| | | f℥ 1 = | 8 = | 480 = | 456.5 = | 1.8047 = | 0.02957 |
| | | | fʒ 1 = | 60 = | 57 = | 9.2256 = | 0.00396 |
| | | | | ♏ 1 = | 0.9 = | 0.0374 = | 0.00066 |

ENGLISH WINE MEASURE.

| *Ton.* | *Pipe or Butt.* | *Punch.* | *Hogsh.* | *Tierce.* | *Gallon.* | *Cub. Inch.* |
|---|---|---|---|---|---|---|
| 1 = | 2 = | 3 = | 4 = | 6 = | 252 = | 58212 |
| | 1 = | $1\frac{1}{2}$ = | 2 = | 3 = | 126 = | 29106 |
| | | 1 | $1\frac{1}{3}$ = | 2 = | 84 = | 19404 |
| | | | 1 = | $1\frac{1}{2}$ = | 63 = | 14553 |
| | | | | 1 = | 42 = | 9902 |
| | | | | | 1 = | 231 |

ENGLISH ALE MEASURE.

| *Hogsh.* | *Barrel.* | *Kilderk.* | *Firkin.* | *Gallon.* | *Quart.* | *Pint.* | *Cub. Inch.* |
|---|---|---|---|---|---|---|---|
| 1 = | $1\frac{1}{2}$ = | 3 = | 6 = | 51 = | 204 = | 408 = | 14382 |
| | 1 = | 2 = | 4 = | 34 = | 136 = | 272 = | 9588 |
| | | 1 = | 2 = | 17 = | 68 = | 136 = | 4794 |
| | | | 1 = | $8\frac{1}{2}$ = | 34 = | 68 = | 2397 |
| | | | | 1 = | 4 = | 8 = | 282 |
| | | | | | 1 = | 2 = | $70\frac{1}{2}$ |
| | | | | | | 1 = | $35\frac{1}{4}$ |

SCOTS LIQUID MEASURE.

| *Gal.* | *Quart.* | *Pint.* | *Choppin.* | *Mutchkin.* | *Gills.* | *Cub. Inch.* |
|---|---|---|---|---|---|---|
| 1 = | 4 = | 8 = | 16 = | 32 = | 128 = | 840 |
| | 1 = | 2 = | 4 = | 8 = | 32 = | 210 |
| | | 1 = | 2 = | 4 = | 16 = | 105 |
| | | | 1 = | 2 = | 8 = | 52.5 |
| | | | | 1 = | 4 = | 26.25 |
| | | | | | 1 = | 6.56 |

In the preceding Tables, the cubic inch of water is estimated at 253 Troy Grains. In the succeeding Tables calculated by Mr Fletcher, it is estimated at 252.506 Troy Grains 60° Fahr. and 29.5 Bar.

| | *Cubic Inches.* | | *Wine Pint.* | | *Ale Pint.* |
|---|---|---|---|---|---|
| 1 lb. Troy, | 22.81134 | = | 0.7900031 | = | 0.6471302 |
| 1 lb. Avoirdupois, | 27.72135 | = | 0.960073 | = | 0.7864429 |

| | *Cubic Inches.* | | *Troy.* | | *lbs.* | *oz.* | *dr.* | *grs.* | | *lbs. Avoir.* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 ale gallon = | 282 | = | 12.362372 | = | 12 | 4 | 2 | 48.12672 | = | 10.172384 |
| 1 ale quart = | 70.5 | = | 3 090568 | = | 3 | 1 | 0 | 42.03168 | = | 2.543096 |
| 1 ale pint = | 35.25 | = | 1.545284 | = | 1 | 6 | 4 | 21.01584 | = | 1.271543 |

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*Table for converting Wine Pints of Water into their equivalent Troy and Avoirdupois Pounds.*

| *Wine Pints.* | | *lbs. Troy.* | | *lbs. Troy.* | *oz.* | *dr.* | *grs.* | | *lbs. Avoirdupois.* |
|---|---|---|---|---|---|---|---|---|---|
| 1 | = | 1.26581783 | = | 1 | 3 | 1 | 31.1 | = | 1.04158725 |
| 2 | = | 2.53163566 | = | 2 | 6 | 3 | 2.2 | = | 2.08317450 |
| 3 | = | 3.79745349 | = | 3 | 9 | 4 | 33.3 | = | 3.12476175 |
| 4 | = | 5.06327132 | = | 5 | 0 | 6 | 4.4 | = | 4.16634900 |
| 5 | = | 6 32908915 | = | 6 | 3 | 7 | 35 5 | = | 5.20793625 |
| 6 | = | 7.59490698 | = | 7 | 7 | 1 | 6.6 | = | 6.24952350 |
| 7 | = | 8.86072481 | = | 8 | 10 | 2 | 37.7 | = | 7.29111075 |
| 8 | = | 10.12654264 | = | 10 | 1 | 4 | 8.8 | = | 8.33269800 |
| 9 | = | 11.39236047 | = | 11 | 4 | 5 | 39.9 | = | 9.37428525 |

---

*Table for converting Cubic Inches of Water (at 60° Fahr. and 29.5 Bar.) into their equivalents in Troy Weight.*

| *Cub. Inch of Water.* | | *Troy grs.* | | *oz.* | *dram.* | *grs.* |
|---|---|---|---|---|---|---|
| 1 | weighs | 252.506 | = | 0 | 4 | 12.506 |
| 2 | | 505.012 | = | 1 | 0 | 25.012 |
| 3 | | 757.518 | = | 1 | 4 | 37.518 |
| 4 | | 1010.024 | = | 2 | 0 | 50.024 |
| 5 | | 1262.530 | = | 2 | 5 | 2.530 |
| 6 | | 1515 036 | = | 3 | 1 | 15.036 |
| 7 | | 1767.542 | = | 3 | 5 | 27.542 |
| 8 | | 2020.048 | = | 4 | 1 | 40.048 |
| 9 | | 2272.554 | = | 4 | 5 | 52.554 |
| 1728 (1 cub. foot) | | ——— | | 909 | 0 | 10.368 |

*Table for converting the Ounce Measure used by Dr Priestley into Cubical Inches.*

| *Ounce Measures.* | *French Cubical Inches.* | *English Cubical Inches.* |
|---|---|---|
| 1 | 1.567 | 1.898 |
| 2 | 3.134 | 3.796 |
| 3 | 4.701 | 5.694 |
| 4 | 6.268 | 7.592 |
| 5 | 7.835 | 9.490 |
| 6 | 9.402 | 11.388 |
| 7 | 10.969 | 13.286 |
| 8 | 12.536 | 15.184 |
| 9 | 14.103 | 17.082 |
| 10 | 15.670 | 18.980 |
| 20 | 31.340 | 37.960 |
| 30 | 47.010 | 56.940 |
| 40 | 62.680 | 75.920 |
| 50 | 78.350 | 94.900 |
| 60 | 94.020 | 113.880 |
| 70 | 109.690 | 132.860 |
| 80 | 125.360 | 151.840 |
| 90 | 141.030 | 170.820 |
| 100 | 156.700 | 189.800 |
| 1000 | 1567.000 | 1898.000 |

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*Correspondence between English and Foreign Weights and Measures.*

NEW FRENCH.

'To employ, as the fundamental unity of all measures, a type 'taken from nature itself, a type as unchangeable as the globe on 'which we dwell,—to propose a metrical system, of which all the 'parts are intimately connected together, and of which the mul-'tiples and subdivisions follow a natural progression, which is 'simple, easy to comprehend :—this is most assuredly a beauti-'ful, great, and sublime idea, worthy of the enlightened age in 'which we live.'

Such were the ideas which influenced the French National Institute, when they chose, as the base of the whole metrical system, the fourth part of the terrestrial meridian, between the equator and the north pole. They adopted the ten millionth part of this arc for the unity of measure, which they denominated *metre*, and applied it both to superficial and solid measures, taking for the unity of the former, *are*, the square of the decuple, and for that of the latter, *litre*, the cube of the tenth part of the metre. They chose for the unity of weight, *gramme*, the quantity of distilled water which the same cube contains when reduced to a con-

stant state presented by nature itself; and, lastly, they decided, that the multiples and submultiples of each kind of measure, whether of weight, capacity, or length, should be always taken in the decimal progression, as being the most simple, the most natural, and the most easy for calculation, according to the system of numeration which all Europe has employed for centuries, and they used the prefixes, *deca*, *hecto*, *kilo*, and *myria*, taken from the Greek numerals, to express the multiplication of the integer by 10, 100, 1000, and 1000 respectively, and *deci*, *centi*, *milli*, taken from the Latin numerals, to express its division.

By a careful measurement of the arc between Dunkirk and Mountjoy, they found the length of the metre to be equal to 443.296 lines of the toise of Peru. The cubic decimetre of distilled water, taken at its maximum of density and weight *in vacuo*, that is, the unity of weight, was found to be 18827.15 grains of the pile of Charlemagne.

| | | | |
|---|---|---|---|
| The *metre* at 32° | = | 39.371 | English inches at 62°. |
| The square metre | = | 1550.075641 | English square inches. |
| The square decimetre | = | 15.50075 | English square inches. |

100 *ares* or square decametres = 2 English acres nearly.

*Cub. feet. cub. inch.*

The cubic metre = 61028.028 English cubic inches = 355 48.028.

The cubic decimetre, or *litre* = 61.028 English cubic inches.

Equal to the bulk of a kilogramme of water.

*Troy gr.*

The gramme or weight of a cubic centimetre of water = 15.44402.

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MEASURES OF LENGTH.

The Metre being at 32°, and the foot at 62°.

| | | English inches. | | Mil. | Fur. | Yards. | Feet. | Inch. |
|---|---|---|---|---|---|---|---|---|
| Millimetre | = | .03937 | | | | | | |
| Centimetre | = | .39371 | | | | | | |
| Decimetre | = | 3.93710 | | | | | | |
| Metre | = | 39.37100 | | | | | | |
| Decametre | = | 393.71000 | = | 0 | 0 | 10 | 2 | 9.7 |
| Hecatometre | = | 3937.10000 | = | 0 | 0 | 109 | 1 | 1 |
| Kilometre | = | 39371.00000 | = | 0 | 4 | 213 | 1 | 10.2 |
| Myriametre | = | 393710.00000 | = | 6 | 1 | 156 | 0 | 6 |

| Metre. | | Eng. feet. | | Inches. |
|---|---|---|---|---|
| 1 | = | 3 | : | 3.371 |
| 2 | = | 6 | : | 6.742 |
| 3 | = | 9 | : | 10.113 |
| 4 | = | 13 | : | 1.484 |
| 5 | = | 16 | : | 4.855 |
| 6 | = | 19 | : | 8.226 |
| 7 | = | 22 | : | 11.597 |
| 8 | = | 26 | : | 2.968 |
| 9 | = | 29 | : | 6.339 |

| Decimetre. | | Eng. inches. |
|---|---|---|
| 1 | = | 3.9731 |
| 2 | = | 7.8742 |
| 3 | = | 11.8113 |
| 4 | = | 15.7484 |
| 5 | = | 19.6855 |
| 6 | = | 23.6226 |
| 7 | = | 27.5597 |
| 8 | = | 31.4968 |
| 9 | = | 35.4339 |

## MEASURES OF CAPACITY.

| | | Cubic inches. | | ENGLISH. Tons. | Hogs. | Wine gal. | Pints. |
|---|---|---|---|---|---|---|---|
| Millilitre | = | .06103 | | | | | |
| Centilitre | = | .61028 | | | | | |
| Decilitre | = | 6.10280 | | | | | |
| Litre | = | 61.02800 | = | 0 | 0 | 0. | 2.1133 |
| Decalitre | = | 610.28000 | = | 0 | 0 | 2. | 5.1352 |
| Hecatolitre | = | 6102.80000 | = | 0 | 0 | 26.419 | |
| Kilolitre | = | 61028.00000 | = | 1 | 0 | 12.19 | |
| Myrialitre | = | 610280.00000 | = | 10 | 1 | 58.9 | |

| Litre. | | Eng. cub. inch. | | Ale pints. | | Wine pints. | | Oz. Troy of water. |
|---|---|---|---|---|---|---|---|---|
| 1 | = | 61.028 | = | 1.7313 | = | 2.11353 | = | 31.104 |
| 2 | = | 122.056 | = | 3.4626 | = | 4.22706 | = | 64.208 |
| 3 | = | 183.084 | = | 5.1939 | = | 6.34059 | = | 96.312 |
| 4 | = | 244.112 | = | 6.9252 | = | 8.45412 | = | 128.416 |
| 5 | = | 305.140 | = | 8.6565 | = | 10.56765 | = | 160.520 |
| 6 | = | 366.168 | = | 10.3878 | = | 12.68118 | = | 192.624 |
| 7 | = | 427.196 | = | 12.1191 | = | 14.79471 | = | 224.728 |
| 8 | = | 488.224 | = | 13.8504 | = | 16.90824 | = | 256.832 |
| 9 | = | 549.252 | = | 15.5817 | = | 19.02177 | = | 288.936 |

## MEASURES OF WEIGHT.

| | | English grains. | | AVOIRDUPOIS. Pounds. | Oun. | Dram. |
|---|---|---|---|---|---|---|
| Milligramme | = | .0154 | | | | |
| Centigramme | = | .1544 | | | | |
| Decigramme | = | 1.5444 | | | | |
| Gramme | = | 15.4440 | | | | |
| Decagramme | = | 154.4402 | = | 0 | 0 | 5.65 |
| Hecatogramme | = | 1544.4023 | = | 0 | 3 | 8.5 |
| Kilogramme | = | 15444.0234 | = | 2 | 3 | 5 |
| Myriagramme | = | 154440.2344 | = | 22 | 1 | 2 |

| *Gram.* | *Troy grs.* | *Deca-gram.* | *Troy dram.* | *grs.* | *Hecto-gram.* | *Troy oz.* | *Avoird. oz.* |
|---|---|---|---|---|---|---|---|
| 1. = | 15.444 | 1. = | 2 : | 34.44 | 1. = | 3.2175 = | 3.5279 |
| 2. = | 30.888 | 2. = | 5 : | 8.88 | 2. = | 6.4350 = | 7.0558 |
| 3. = | 46.332 | 3. = | 7 : | 43.32 | 3. = | 9.6525 = | 10.5837 |
| 4. = | 61.776 | 4. = | 10 : | 17.76 | 4. = | 12.8700 = | 14.1116 |
| 5. = | 77.220 | 5. = | 12 : | 52.20 | 5. = | 16.0875 = | 17.6395 |
| 6. = | 92.664 | 6. = | 15 : | 26.64 | 6. = | 19.3050 = | 21.1674 |
| 7. = | 108.108 | 7. = | 18 : | 1.08 | 7. = | 22.5295 = | 24.6953 |
| 8. = | 123.552 | 8. = | 20 : | 35.52 | 8. = | 25.7400 = | 28.2232 |
| 9. = | 138.996 | 9. = | 23 : | 9.96 | 9. = | 28.9575 = | 31.7511 |

The decimal progression of all the French weights and measures renders it only necessary to change the decimal point in order to convert one into the equivalent of any other of the same species and numerically the same, but of a different denomination. Thus as 9 litres are equal to 15.5817 ale pints, 9 hectolitres will be equal to 1558.17 ale pints; and so of the rest.

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## *Weights and Measures used in France before the Revolution.*

### DIVISION OF FRENCH WEIGHTS.

| | *Pound.* | *Ounces.* | *Gros.* | *Deniers.* | *Grains.* | *Troy Grs.* |
|---|---|---|---|---|---|---|
| Poids de Marc | 1 = | 16 = | 128 = | 384 = | 9216 = | 7561 |
| Apothecary | 1 = | 12 = | 96 = | 288 = | 6912 = | 5670.5 |
| Marc | 1 = | 8 = | 84 = | 142 = | 4808 = | 3780.5 |
| | | 1 = | 8 = | 24 = | 576 = | 472.6 |
| | | | 1 = | 3 = | 72 = | 59.1 |
| | | | | 1 = | 24 = | 19.7 |
| | | | | | 1 = | 0.8 |

| | *Troy grains.* | | |
|---|---|---|---|
| The French pound = | 7561 | = 1.31268 | lb. troy. |
| ounce = | 472.5625 | = 0.984504 | oz. troy. |
| gros = | 59.0703125 | = 0.984504 | dram. |
| grain = | 0.820421 | | |

| | | |
|---|---|---|
| The English troy pound of 12 ounces | = 7021 | Paris grains. |
| The troy ounce - - | = 585.0833 | |
| The dram of 60 grains - | = 73.1351 | |
| The penny weight or denier, of 24 grains | 29.2544 | |
| The scruple of 20 grains | = 4.3784 | |
| The grain - - - | = 1.2189 | |
| The avoirdupois pound of 16 ounces, or 7000 troy grains, | = 8538. | Paris grains. |
| The ounce - - | = 533.6250 | |

| | |
|---|---|
| To reduce Paris grains to English grains, divide by<br>English grains to Paris grains multiply by | 1.2189 |
| Paris ounces to English troy ounces, divide by<br>English troy ounces to Paris ounces, multiply by | 1.015734 |
| Pound (Poids de Marc) to troy pound, multiply by<br>Troy pound to pound Poids de Marc, divide by | 1.31268 |

---

*Table shewing the Comparison between English and French Weights (Poids de Marc.)*

| English Grs. | | French Grs. | English Grs. | | French Grs. |
|---|---|---|---|---|---|
| 1 | = | 1.2189 | 9 | = | 10.9704 |
| 2 | = | 2.4378 | 10 | = | 12.1890 |
| 3 | = | 3.6568 | 20 | = | 24.378 |
| 4 | = | 4.8757 | 30 | = | 36 568 |
| 5 | = | 6.0947 | 40 | = | 48 757 |
| 6 | = | 7.3136 | 50 | = | 60.947 |
| 7 | = | 8.5325 | 60 | = | 73.136 |

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| French Grs. | | Troy Grs. | French Grs. | | Troy Grs. |
|---|---|---|---|---|---|
| 1. | = | 0.820421 | 10. | = | 8.20421 |
| 2. | = | 1.640842 | 20. | = | 16.40842 |
| 3. | = | 2.461263 | 30. | = | 24.61263 |
| 4. | = | 3.281684 | 40. | = | 32.81684 |
| 5. | = | 4.102105 | 50. | = | 41.02105 |
| 6. | = | 4.922526 | 60. | = | 49.22526 |
| 7. | = | 5.742947 | 70. | = | 57.42947 |
| 8. | = | 6.563368 | 72. | = | 59.070312 |
| 9. | = | 7.383789 | | | |

| Gros. | | Drams. | | Grs. | Gros. | | Drams. | | Grs. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | = | 0 | : | 59.07 | 5 | = | 4 | : | 55.35 |
| 2 | = | 1 | : | 58.14 | 6 | — | 5 | : | 54.42 |
| 3 | = | 2 | : | 57.21 | 7 | = | 6 | : | 53.49 |
| 4 | = | 3 | : | 56.28 | | | | | |

| Fr. oz. | | Troy oz. | | Drs. | | Grs. | Fr. oz. | | Troy oz. | | Drs. | | Grs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | = | 0 | : | 7 | : | 52.56 | 9. | = | 8 | : | 6 | : | 53.04 |
| 2. | = | 1 | : | 7 | : | 45.12 | 10. | = | 9 | : | 6 | : | 45.60 |
| 3. | = | 2 | : | 7 | : | 37.68 | 11. | = | 10 | : | 6 | : | 38.16 |
| 4. | = | 3 | : | 7 | : | 30.24 | 12. | = | 11 | : | 6 | : | 30.72 |
| 5. | = | 4 | : | 7 | : | 22.80 | 13. | = | 12 | : | 6 | : | 23.28 |
| 6. | = | 5 | : | 7 | : | 15.36 | 14. | = | 13 | : | 6 | : | 15.84 |
| 7. | = | 6 | : | 7 | : | 7.92 | 15. | = | 14 | : | 6 | : | 8.40 |
| 8. | = | 7 | : | 7 | : | 0.48 | | | | | | | |

| *Fr. pounds.* | | *Tr. oz. dr. grs.* | *Fr. pounds.* | | *Tr. oz. dr. grs.* |
|---|---|---|---|---|---|
| 1. | = | 15 : 6 : 1 | 6. | = | 94 : 4 : 6 |
| 2. | = | 31 : 4 : 2 | 7. | = | 110 : 2 : 7 |
| 3. | = | 47 : 2 : 3 | 8. | = | 126 : 0 : 8 |
| 4. | = | 63 : 0 : 4 | 9. | = | 141 : 6 : 9 |
| 5. | = | 78 : 6 : 5 | | | |

LONG MEASURE.

| | | *French Inches.* *feet.* | *inches.* | *lines.* | | *English Inches.* |
|---|---|---|---|---|---|---|
| The French ell, *Aune,* | = | 3 | 7 | 1.05 | = | 46.69 |
| The half toise | = | 3 | | | = | 38.355 |

| | | *English Foot.* | | |
|---|---|---|---|---|
| The foot | = | 1.0654167 | = | 12.785 |
| The inch | | | = | 1.0654 |
| The line | | | = | 0.0888 |

| | | *French Foot.* | | *French Inches.* |
|---|---|---|---|---|
| The English foot | = | 0.9386 | = | 11.2632 |
| The inch | | | = | 0.9386 |
| The line | | | = | 00.7823 |

To reduce French feet or inches to English feet or inches, multiply by 1.0654167, or divide by 0.9386.

To reduce English long measure to French, multiply by 0.9386, or divide by 1.0654167.

*Tables expressing the value of French feet and inches in English Measure.*

| *French feet.* | | *English inches.* | *Fr. feet or in.* | | *Eng. feet or in.* |
|---|---|---|---|---|---|
| 1. | = | 12.785 | 1 | = | 1.0654 + |
| 2. | = | 25.570 | 2 | = | 2.1308 |
| 3. | = | 38.355 | 3 | = | 3.1962 |
| 4. | = | 51.140 | 4 | = | 4.2616 |
| 5. | = | 63.925 | 5 | = | 5.3270 |
| 6. | = | 76.710 | 6 | = | 6.3925 |
| 7. | = | 89.495 | 7 | = | 7.4579 |
| 8. | = | 102.280 | 8 | = | 8.5233 |
| 9. | = | 115.065 | 9 | = | 9.5887 |
| 10. | = | 127.850 | 10 | = | 10.6541 |
| | | | 11 | = | 11.7195 |
| | | | 12 | = | 12.7850 |

## SQUARE MEASURE.

The French square foot or inch = 1.13510 English.
The English square foot or inch = .88126 French.

To reduce French square measure to English multiply by 1.13510, or divide by 0 88126.

To reduce English square measure to French, multiply by 0.88126, or divide by 1.13510.

## CUBE MEASURE.

The French cubic foot or inch, = 1.209367 English.
The English cubic foot or inch, = 0.8263784 French.

To reduce French cube measure to English, multiply by 1.209367, or divide by 0.8268784.

To reduce English cube measure to French, multiply by 0.8268784, or divide by 1.209367.

When one French cubic inch weighs 1 grain French, or contains 1 grain of any substance; one English cubic inch weighs or contains 0.67839 English grains.

To reduce the weight or contents of French cube measure in French grains, to the weight or contents of English cube measure in Troy grains, multiply by 0.67839.

| *French cube foot or inch.* | | *Eng. cube foot or inch.* | *French cube foot or inch.* | | *Eng. cube foot or inch.* |
|---|---|---|---|---|---|
| 1 | = | 1.2093+ | 6 | = | 7.2562 |
| 2 | = | 2.4187 | 7 | = | 8.4655 |
| 3 | = | 3.6181 | 8 | = | 9.6749 |
| 4 | = | 4.8374 | 9 | = | 10 8842 |
| 5 | = | 6.0468 | 10 | = | 12.0936 |

## MEASURES OF CAPACITY FROM BAUMÉ.

| | *Pint.* | | *chop.* | | *demisetier.* | | *poisson.* | | *demipoisson.* | | *oz.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pinte | 1 | = | 2 | = | 4 | = | 8 | = | 16 | = | 32 |
| Chopine | | | 1 | = | 2 | = | 4 | = | 8 | = | 16 |
| Demisetier | | | | | 1 | = | 2 | = | 4 | = | 8 |
| Poisson | | | | | | | 1 | = | 2 | = | 4 |
| Demipoisson | | | | | | | | | 1 | = | 2 |
| Once | | | | | | | | | | = | 1 |

The legal pint in common use in Paris seems to have been different from that now taken from Baumé, which perhaps is peculiar to apothecaries. Their relations are the following:

| | *Fr. cub. in.* | | *Eng. cub. in.* | | *Eng. wine pint.* | | *Tr. pound.* | | *Litres.* |
|---|---|---|---|---|---|---|---|---|---|
| Common pinte = | 48 | = | 58.05 | = | 2.01 | = | 2.54 | = | 0.95 |
| Baumé's pinte = | 49.52 | = | 59.89 | = | 2.07 | = | 2.62 | = | 0.98 |

*Table shewing the relative value of the old and new French weights and measures in round numbers. (Parmentier.)*

| | | |
|---|---|---|
| Kilogramme | = | 2 livres, Poid de Marc |
| Demikilogramme | = | 1 livre |
| Gramme | = | 18 grains |
| Demigramme | = | 9 grains |
| 2 Grammes | = | ½ gros |
| 4 Grammes | = | 1 gros |
| 8 Grammes | = | 2 gros |
| 32 Grammes | = | 1 once |
| Decigramme | = | 2 grains |
| Demidecigramme | = | 1 grain |
| 3 Decigramme | = | 6 grains |
| 12 Decigramme | = | 24 grains |
| 1 Litre | = | 1 pinte |
| Demilitre | = | 1 chopine |
| Quart de Litre | = | demisetier |

## GERMAN.

### COLOGNE WEIGHT.

| *Marc.* | *Oz.* | *Loth.* | *Drs.* | *Pwts.* | *Hellers.* | *As.* | *Eschen.* | *Grs.* | *St.parts* |
|---|---|---|---|---|---|---|---|---|---|
| 1 = | 8 = | 16 = | 64 = | 256 = | 512 = | 1792 = | 4352 = | 6144 = | 65536 |
| | 1 = | 2 = | 8 = | 32 = | 64 = | 224 = | 544 = | 768 = | 8192 |
| | | 1 = | 4 = | 16 = | 32 = | 112 = | 272 = | 384 = | 4096 |
| | | | 1 = | 4 = | 8 = | 28 = | 68 = | 96 = | 1024 |
| | | | | 1 = | 2 = | 7 = | 17 = | 24 = | 256 |

### NUREMBERG OR APOTHECARIES WEIGHT.

| *Pound.* | | *Ounces.* | | *Drachms.* | | *Scruples.* | | *Grains.* | | *Troy grs.* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | = | 12 | = | 96 | = | 288 | = | 5760 | = | 5388 |
| | | 1 | = | 8 | = | 24 | = | 480 | = | 460.5 |
| | | | | 1 | = | 3 | = | 60 | = | 57.5 |
| | | | | | | 1 | = | 20 | = | 19.2 |
| | | | | | | | | 1 | = | 0.96 |

*Table shewing the Comparison between Grammes and Troy, French, and Nuremberg Apothecary Grains.*

| *Gramme.* | | *Troy.* | | *Poids de Marc.* | | *Nuremberg.* |
|---|---|---|---|---|---|---|
| 1 | = | 15.444 | = | 18.883 | = | 16.128 |
| 2 | = | 30.888 | = | 37.766 | = | 32.256 |
| 3 | = | 46.332 | = | 56.648 | = | 48.384 |
| 4 | = | 61.776 | = | 75.530 | = | 64.512 |
| 5 | = | 77.220 | = | 94.413 | = | 80.641 |
| 6 | = | 92.664 | = | 113.296 | = | 96.769 |
| 7 | = | 108.108 | = | 132.179 | = | 112.897 |
| 8 | = | 123.552 | = | 151.062 | = | 129.026 |
| 9 | = | 138.996 | = | 169.944 | = | 145.154 |
| 10 | = | 154.440 | = | 188.827 | = | 161.282 |

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*Swedish Weights and Measures, used by Bergman and Scheele.*

The Swedish pound, which is divided like the English apothecary, or troy pound, weighs 6556 grains troy.

The kanne of pure water, according to Bergman, weighs 42250 Swedish grains, and occupies 100 Swedish cubical inches. Hence the kanne of pure water weighs 48083.719444 English troy grains, or is equal to 189.9413 English cubic inches ; and the Swedish longitudinal inch is equal to 1.238435 English longitudinal inches.

From these data, the following rules are deduced :

1. To reduce Swedish longitudinal inches to English, multiply by 1.2384, or divide by 0.80747.

2. To reduce Swedish to English cubical inches, multiply by 1.9, or divide by 0.5265.

3. To reduce the Swedish pound, ounce, drachm, scruple, or grain, to the corresponding English troy denomination, multiply by 1.1382, or divide by .8786.

4. To reduce the Swedish kannes to English wine-pints, multiply by .1520207, or divide by 6.57804.

5. The lod, a weight sometimes used by Bergman, is the 32d part of the Swedish pound ; therefore, to reduce it to the English troy pound, multiply by .03557, or divide by 28.1156.

## *Tables of Specific Gravities.*

### METALS.

| | | | |
|---|---|---|---|
| Platinum | 21.5 | Arsenic, sulphuret, red | 3.225 |
| Gold | 19.361 | ——— yellow | 5.315 |
| Tungsten | 17.6 | Iron | 7.788 |
| Mercury at —40° | 15.612 | —— sulphuret | 4.518 |
| ——— at 47° | 13.545 | —— supersulphuret | 4.83 |
| Sulphuret of ditto | 10. | Cobalt | 7.700 |
| Palladium | 11.871 | Tin | 7.299 |
| Rhodium | 11.+ | Zinc | 6.861 |
| Lead | 11.352 | Manganese | 6.850 |
| Sulphuret of ditto | 7. | Antimony | 6.712 |
| Silver | 10.510 | ——— sulphuret | 4.368 |
| —— sulphuret | 7.2 | Tellurium | 6.115 |
| Bismuth | 9.822 | Sodium | 0.935 |
| ——— sulphuret | 6.131 | Potassium | 0.85 |
| Uranium | 9. | **INFLAMMABLES.** | |
| Copper | 8.895 | Sulphur, native | 2.033 |
| Nickel | 8.666 | ——— melted | 1.990 |
| Molybdenum | 8.600 | Phosphorus | 1.714 |
| ——— sulphuret | 4.73 | Diamond | 3.521 |
| Arsenic | 8.310 | Charcoal | 2.+ |

### SALINE SUBSTANCES.

| | | | | |
|---|---|---|---|---|
| Sulphuric acid | 2.125 | Potass, carbonate | 2.749 | M |
| Nitric | 1.504 | —— supertartrate | 1.953 | H |
| Muriatic | 1.194 | | 1.8745 | M |
| Acetic | 1.0626 | —— tartrate | 1.5567 | H |
| Red vinegar | 1.025 | Soda | 1.336 | H |
| White ditto | 1.014 | —— sulphate | 2.246 | Wal |
| Distilled | 1.010 | | 1.380 | Wat |
| Phosphoric | 1.5575 | | 1.4457 | H |
| Citric | 1.0345 | —— muriate | 2.[illegible]5 | F |
| Arsenious | 1.8731 | | 2.120 | K |
| | | | 2.143 | Wat |

| | | | | | |
|---|---|---|---|---|---|
| Potass | 1.7085 | H | | 2.200 | H |
| | 4.6215 | K | —— sub-borate | 1.740 | K |
| —— sulphate | 2.298 | Wal | | 1.720 | Wal |
| | 2.636 | Wat | | 1.757 | Wat |
| | 2.4073 | H | —— phosphate | 1.333 | H |
| —— sulphite | 1.586 | V | —— subcarbonate | 1.3591 | H |
| —— nitrate | 1.933 | Wat | | 1.421 | K |
| | 1.000 | Wal | —— acetate | 2.1 | H |
| | 1.9369 | H | —— and potash tar. | 1.757 | Wat |
| | 2.15 | F | Ammonia, liquid | 0.[illegible]54 | D |
| —— muriate | 1.836 | K | ——— muriate | 1.[illegible]50 | Wat |
| —— carbonate | 2.012 | H | | 1.453 | Wal |

SALINE SUBSTANCES.

| | | |
|---|---|---|
| Ammonia, muriate | 1.420 | K |
| ——— carbonate | 0.966 | H |
| | 1.824 | K |
| | 1.5026 | M |
| | 1.450 | V |
| Lime - - | 2.3908 | K |
| | 2.37 | M |
| | 1.5233 | H |
| —— muriate | 1.76 | H |
| —— carbonate | 2.7 | |
| Magnesia - | 2.3298 | K |
| | 0.346 | H |
| ——— sulphate | 1.6603 | H |
| Magnesia, carbonate | 0.2941 | H |
| Barytes - | 4 | K |
| | 2.374 | H |
| ——— muriate | 2.8257 | H |
| ——— carbon. nat. | 4.331 | |
| ———— art. | 3.763 | |
| Alumina - | 2.000 | K |
| | 0.8200 | H |
| Alum - | 1.7109 | H |
| | 1.719 | Wal |
| | 1.757 | Wat |
| | 1.738 | F |
| | 1.714 | N |
| | 1.726 | M |

METALLIC SALTS.

| | | |
|---|---|---|
| Mercury, muriate | 5.1398 | H |
| | 4.142 | Wat |
| ——— submuriate | 7.1758 | H |
| ——— phosphate | 4.9835 | H |
| ——— subsulphate | 6.44 | Wat |
| Copper, sulphate of | 2.1943 | H |
| | 2.230 | Wat. |
| ——— acetate | 1.779 | H |
| Iron, sulphate of | 1.8399 | H |
| | 1.880 | Wal |
| Iron, sulphate of | 1.812 | Wat |
| ———— calc. | 2.636 | Wat |
| Lead, sulphate | 1.8742 | H |
| —— carbonate | 7.2357 | |
| —— acetate | 2.345 | H |
| Zinc, sulphate | 2.3953 | M |
| | 1.933 | Wat |
| | 1.912 | H |
| | 1.712 | N |

D Davy. H Hassenfratz. K Kirwan. M Muschenbrock. Wal Wallerius. Wat Watson. F Fahrenheit. V Vauquelin. N. Newton.

EXTRACTS, GUMS, RESINS.

| | |
|---|---|
| Acacia, prunus spinosa | 1.5153 |
| Aloes hepatic - | 1.3586 |
| —— socotorine | 1.3796 |
| Alouchi - - | 1.0604 |
| Amber yellow transparent - - | 1.0780 |
| ———— opaque | 1.0855 |
| ——— red - | 1.0834 |
| ——— green - | 1.0829 |
| Ambergris - | 0.7800 / 0.9263 |
| Ammoniac - | 1.2071 |
| Anime, oriental | 1.0284 |
| ——— occidental | 1.0426 |
| Arabic - - | 1.4523 |
| Arcanson - | 1.0857 |
| Arecha (Catechu?) | 1.4573 |
| Arnotto - - | 0.5956 |
| Asphaltum, cohesive, | 1.450 / 2.060 |
| ——— compact | 1.070 / 1.165 |
| Assafœtida - | 1.3275 |
| Baras - - | 1.0441 |
| Bdellium - | 1.1377 |
| Benzoin - | 1.0924 |
| Bitumen of Judea | 1.104 |
| Cachibou - - | 1.0640 |
| Camphor - | 0.9887 |
| Caoutchouc - | 0.9335 |
| Caragna - | 1.1244 |
| Catechu - | 1.4573 |

EXTRACTS, GUMS, RESINS.

| | | | |
|---|---|---|---|
| Cherry - - | 1.4817 | Opium - - | 1.3365 |
| Copal, opaque - | 1.1398 | Opoponax - | 1.6226 |
| —— transparent | 1.0452 | Resin of Jalap - | 1.2185 |
| Cork - - | 0.2400 | Rosin - | 1.0772 |
| Dragon's blood - | 1.2045 | Sandarac - | 1.0920 |
| Elemi - - | 1.0682 | Sagapenum - | 1.2008 |
| Euphorbium - | 1.1244 | Sarcocol - | 1.2684 |
| Galbanum - - | 1.2120 | Scammony of Aleppo | 1.2354 |
| Galipot - - | 1.0819 | ———— Smyrna | 1.2743 |
| Gamboge - | 1.2216 | Inspissated juice of St John's wort - | 1.5263 |
| Guaiac - | 1.2289 | Storax - - | 1.1098 |
| Lac - - - | 1.1390 | Sugar, white - | 1.6060 |
| Honey - - | 1.4500 | Tacamahaca - | 1.0463 |
| Hypociste - | 1.5263 | Tragacanth - | 1.8161 |
| Liquorice - | 1.7228 | Turpentine - | 0.991 |
| Indigo - | 0.7690 | Wax, ouarouchi - | 0.8970 |
| Ivy - | 1.2948 | —— bees - | 0.9648 |
| Labdanum - | 1.1862 | —— white - | 0.9686 |
| Mastic - | 1.0742 | —— shoemakers | 0.897 |
| Myrrh - | 1.3600 | | |
| Olibanum - - | 1.1732 | | |

OILS.

| *Volatile.* | | *Fixed.* | |
|---|---|---|---|
| Cinnamon - | 1.044 | Tallow - - | 0.9419 |
| Cloves - | 1.036 | Fat of beef - | 0.9232 |
| Lavender - | 0.894 | —— mutton - | 0.9235 |
| Mint - - | 0.8982 | —— veal - | 0.9342 |
| Sage - - | 0.9016 | —— pork - | 0.9368 |
| Thyme - | 7.9023 | Naphtha - | 0.8475 |
| Rosemary - | 9.9057 | Butter - - | 0.9423 |
| Calamint - | 0.9116 | Gaiva butter - | 0.8916 |
| Scurvy-grass - | 0.9427 | Oil of filberts - | 0.916 |
| Wormwood - | 0.9073 | ——— walnut - | 0.9227 |
| Tansy - - | 0.9949 | ——— hemp-seed | 0.9258 |
| Chamomile - | 0.8943 | ——— poppies - | 0.9238 |
| Savine - - | 0.9294 | ——— rape-seed | 0.9193 |
| Fennel - | 0.9294 | ——— lint-seed | 0.9403 |
| —— seed - | 1.0083 | ——— whale - | 0.9233 |
| Coriander seed - | 0.8655 | ——— ben - | 9.9119 |
| Caraway seed - | 0.9049 | ——— beechmast | 0.9176 |
| Dill seed - | 0.9128 | ——— cod-fish | 0.9233 |
| Anise seed - | 0.9867 | ——— olives - | 0.9153 |
| Juniper - | 0.8577 | ——— almonds | 0.9170 |
| Turpentine - | 0.8697 | Spermaceti - | 0.9433 |
| Amber - | 0.8867 | | |
| Orange flower - | 0.8798 | | |
| Hyssop - | 0.8892 | | |

WOODS, BARKS, &c.

| | | | |
|---|---|---|---|
| Cinchona | 0.7840 | Mahogany | 1.0630 |
| Logwood | 0.9130 | Red saunders | 1.1280 |
| Madder | 0.7650 | Sassafras | 0.4820 |

ALKOHOL, ETHERS.

| | | | |
|---|---|---|---|
| Sulphuric | 0.7396 | Acetic | 0.8664 |
| Nitric | 0.9088 | Alkohol | 0.8293 |
| Muriatic | 0.7296 | Proof-spirit | 0.916 |

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SPECIFIC GRAVITY OF GASES.

| | *Weights of* 100 *cubic inches in Troy grains.* | *Specific gravity.* | *Authority.* |
|---|---|---|---|
| Hydrogen | 2.23 | 0.07321 | Biot and Arago. |
| Phosphuretted hydrogen | 13.265 | 0.4347 | Sir H. Davy. |
| Ditto | 25.98 | 0.8518 | Dalton and Henry. |
| Arseniated hydrogen | 16.13 | 0.529 | Tromsdorff. |
| Carburetted hydrogen | | 0.538 | Berthollet |
| Ditto from stagnant water | 20.66 | 0.666 | Dalton. |
| Ammonia | 18.18 | 0.596 | Allen and Pepys. |
| Steam | | 0.622 | Gay-Lussac. |
| Hydrophosphoric | 26.53 | 0.870 | Sir H. Davy. |
| Carbonic oxide | 30.19 | 0.967 | Cruickshank. |
| Azote | 29.55 | 0.9691 | Biot and Arago. |
| Olefiant | 29.72 | 0.974 | Thomson. |
| Air | 30.50 | 1.000 | Sir G. Schuckburgh. |
| Percarburetted hydrogen | | 1.000 | T. Saussure. |
| Nitrous gas | 32. | 1.049 | Sir H. Davy. |
| Ditto | 31.684 | 1.0388 | Berard. |
| Oxygen | 33.82 | 1.1088 | Allen and Pepys. |
| Ditto | | 1.10359 | Biot and Arago. |
| Sulphuretted hydrogen | 35.89 | 1.177 | Sir H. Davy. |
| Ditto | | 1.1912 | Gay-Lussac and Thenard. |
| Muriatic acid | 38.97 | 1.278 | Sir H. Davy and Biot. |
| Carbonic acid | 47.26 | 1.5495 | Allen and Pepys. |
| Ditto | 46.31 | 1.518 | Saussure. |
| Nitrous oxide | 49.227 | 1.614 | Sir H. Davy. |
| Vapour of alkohol | 65. | 2.100 | Dalton. |
| Ditto | | 1.5 | Gay-Lussac. |
| Nitrous acid | | 2.10999 | Gay-Lussac. |
| Sulphurous acid | 66.89 | 2.193 | Sir H. Davy. |
| Ditto | | 2.2553 | Gay-Lussac and Thenard. |
| Muriatic ether | | 2.219 | Thenard. |
| Vapour of sulphuric ether | 70. | 2.250 | Dalton. |
| Ditto | | 2.396 | Gay-Lussac. |
| Fluoboracic | 72.31 | 2.370 | John Davy. |
| Euchlorine | 74. | 2.409 | |
| Hyperoxymuriatic acid | | 2.41744 | John Davy. |
| Carburetted sulphur, vapour | | 2.670 | Gay-Lussac. |
| Nitric acid | 76. | 2.425 | Sir H. Davy. |
| Chlorine | 76.50 | 2.5082 | Sir H. Davy. |
| Silicated fluoric | 91.19 | 2.990 | John Davy. |
| Chloride of carbonic oxide | 111.91 | 3.669 | John Davy. |
| Hydriodic | | 4.4288 | |
| Iodine in vapour | 117.71 | | |
| Water | 252.506 | | Fletcher. |

SOLUTIONS OF SALTS AT 42° FAHRENHEIT. WATSON.

| | *Saturated.* | | *In 12 waters.* |
|---|---|---|---|
| Lime - - - | 1 001 | | |
| Arsenious acid - - | 1 005 | | |
| Sub-borate of soda - | 1.010 | | |
| Muriate of mercury - - | 1.037 | | |
| Alum - - - | 1.033 | | |
| Sulphate of soda - - | 1.052 | - | 1.029 |
| —— —— potass - - | 1.054 | | |
| Muriate of soda - - | 1 198 | - | 1.059 |
| Arseniate of potass - - | 1.184 | | |
| Muriate of ammonia - | 1.072 | - | 1.026 |
| Carbonate of ditto - - | 1.077 | | |
| Oxalate of ammonia (Thomson) | 1.0186 | | |
| Nitrate of potass - - | 1.095 | - | 1.050 |
| Tartrate of potass and soda | 1.114 | | |
| Sulphate of copper - - | 1.150 | - | 1.052 |
| ———— iron - - | 1.157 | - | 1.043 |
| ———— magnesia - | 1.218 | | |
| ———— zinc - - | 1.386 | . | 1.045 |
| Subcarbonate of potass - | 1.534 | | |

*Table of Specific Gravities indicated in the different Pharmacopœias.*

| | *Dublin.* | *London.* | *Edinburgh.* |
|---|---|---|---|
| Sulphuric ether - - | 765 | | |
| Nitrous ether - - | 900 | | |
| Spirit of nitrous ether - - | 850 | | |
| Alcohol - - - - | 815 | 815 | |
| Rectified spirit *(alcohol fortius)* | 840 | 835 | 835 |
| Proof spirit *(alcohol dilutius)* - | 930 | 930 | 935 |
| Acetic acid - - | 1070 | | |
| Distilled vinegar - | 1006 | | |
| Oxymuriatic acid - - - | 1003 | | |
| Muriatic acid - - | 1170 | 1160 | 1170 |
| ————diluted - - | 1080 | | |
| Nitrous acid - - | 1500 | 1500 | 1520 |
| ————diluted - | 1280 | | |
| Sulphuric acid - - | 1845 | 1850 | 1845 |
| ———— diluted - | 1090 | | |
| Solution of potass - - | 1100 | 1050 | |
| ———— ammonia - - | 936 | 960 | |
| ———— carbonate of ammonia - | 1095 | | |
| ———— carbonate of soda saturated | 1220 | | |
| ———— oxymuriate of potass - | 1087 | | |
| ———— sulphuret of potass - | 1120 | | |
| Tincture of muriate of iron (red) | 1050 | | |

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*Table for reducing the Degrees of Baumé's Hydrometer to the Common Standard.*

BAUMÉ'S HYDROMETER FOR LIQUIDS LIGHTER THAN WATER.

Temperature 55° Fahrenheit, or 10° Reaumur.

| *Deg.* | *Sp. Gr.* | *Deg.* | *Sp. Gr.* | *Deg.* | *Sp. Gr.* | *Deg.* | *Sp. Gr.* |
|---|---|---|---|---|---|---|---|
| 10 | 1.000 | 18 | .942 | 26 | .892 | 34 | .847 |
| 11 | .990 | 19 | .935 | 27 | .886 | 35 | .842 |
| 12 | .982 | 20 | .928 | 28 | .880 | 36 | .837 |
| 13 | .977 | 21 | .922 | 29 | .874 | 37 | .832 |
| 14 | .970 | 22 | .915 | 30 | .867 | 38 | .827 |
| 15 | .963 | 23 | .909 | 31 | .871 | 39 | .822 |
| 16 | .955 | 24 | .903 | 32 | .856 | 40 | .817 |
| 17 | .949 | 25 | .897 | 33 | .852 | | |

LIQUIDS HEAVIER THAN WATER.

| *Deg.* | *Sp. Gr.* | *Deg.* | *Sp. Gr.* | *Deg.* | *Sp. Gr.* | *Deg.* | *Sp. Gr.* |
|---|---|---|---|---|---|---|---|
| 0 | 1.000 | 21 | 1.170 | 42 | 1.414 | 63 | 1.779 |
| 3 | 1.020 | 24 | 1.200 | 45 | 1.455 | 66 | 1.848 |
| 6 | 1.040 | 27 | 1.230 | 48 | 1.500 | 69 | 1.920 |
| 9 | 1.064 | 30 | 1.261 | 51 | 1.547 | 72 | 2.000 |
| 12 | 1.089 | 33 | 1.295 | 54 | 1.594 | | |
| 15 | 1.114 | 36 | 1.333 | 57 | 1.659 | | |
| 18 | 1.140 | 39 | 1.373 | 60 | 1.717 | | |

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## HEAT.

### CORRESPONDENCE BETWEEN DIFFERENT THERMOMETERS.

Fahrenheit's thermometer is universally used in this kingdom. In it the range between the freezing and boiling points of water is divided into 180 degrees; and as the greatest possible degree of cold was supposed to be that produced by mixing snow and muriate of soda, it was made the zero; hence the freezing point became 32°, and the boiling point 212°.

The Centigrade thermometer places the zero at the freezing point, and divides the range between it and the boiling point into 100°. This has long been used in Sweden, under the title of Celsius's thermometer.

Reaumur's thermometer, which was formerly used in France, divides the space between the freezing and boiling of water into 80°, and places the zero at the freezing point.

Wedgwood's pyrometer is only intended to measure very high temperatures. According to its author, its zero corresponds with 1077° of Fahrenheit's, and each degree of Wedgwood is equal to 130 of Fahrenheit. Guyton Morveau has, however, given good reason for believing that the zero is placed too high, and that the measure of the degree of this scale has been much overrated; and he accordingly fixes the zero of Wedgwood at 517.579 Fahrenheit, and reduces the measure of the degree of Wedgwood to 62.5.

De Lisle's thermometer is used in Russia. The graduation begins at the boiling point, and increases towards the freezing point. The boiling point is marked 0, and the freezing point 150.

Therefore $180° \text{ F} = 100° \text{ C} = 80° \text{ R} = \frac{18}{13} \text{ W}$, or $= \frac{180}{62.5} \text{W}$.

*Formulae.*

1. To reduce centigrade degrees to those of Fahrenheit, multiply by 9, and divide by 5, and to the quotient add 32, that is, $\frac{C \times 9}{5} + 32 = F$.

2. To reduce Fahrenheit's degrees to centigrade, $\frac{F - 32 \times 5}{9} = C$.

3. To reduce Reaumur's to Fahrenheit's, $\frac{R \times 9}{4} + 32 = F$.

4. To convert Fahrenheit to Reaumur, $\frac{F - 32 \times 4}{9} = R$.

5. To reduce Wedgwood's degrees to those of Fahrenheit, $W \times 130 + 1077 = F$; or, according to Guyton Morveau's estimate, $W \times 62.5 + 517.579 = F$.

6. Inversely, to reduce Fahrenheit to Wedgwood, $\frac{F - 1077}{130} = W$; or according to Guyton Morveau, $\frac{F - 517.579}{62.5} = W$.

## *Table of the Effects of Heat.*

### 1. FREEZING POINTS OF LIQUIDS.

| *Reaum.* | *Cent.* | *Fahren.* | |
|---|---|---|---|
| | | —90 | Greatest artificial cold observed |
| —44 | —66 | —55 | Strongest nitric acid freezes (Cavendish) |
| —35 | —43 | —46 | Ether and liquid ammonia |
| —32 | —39 | —39 | Mercury |
| —30 | —37 | —36 | Sulphuric acid (Thomson) |
| —23 | —30 | —22 | Acetous acid |
| —19 | —24 | —11 | 2 Alcohol, 1 water |
| —17 | —14 | —7 | Brandy ; Snow 3 parts, with salt 2 |
| —14 | —17 | +1 | Strongest sulphuric acid (Cavendish) |
| —7 | —9 | 16 | Oil of turpentine (Margueron) |
| —5 | —6 | 20 | Strong wines |
| —4 | —5 | 23 | Fluoric acid |
| | | | Oils of bergamot and cinnamon |
| —3 | —4 | 25 | Human blood |
| —2 | —2.5 | 28 | Vinegar |
| —1 | —12.5 | 30 | Milk |
| 0 | 0 | 32 | Water freezes |
| +2 | +2.5 | 36 | Olive oil |
| 6 | 7 | 45 | Sulphuric acid, specific gravity, 1-78 (Keir) |
| 14 | 17 | 64 | Oil of aniseeds, 50 (Thomson) |

### 2. MELTING POINTS OF SOLIDS.

| | | | |
|---|---|---|---|
| 4 | 5 | 40 | Equal parts sulphur and phosphorus |
| 22 | 28 | 82 | Adipocire of muscle |
| 29 | 36 | 97 | Lard (Nicholson) |
| 30 | 37 | 99 | Phosphorus (Pelletier) |
| 32 | 40 | 104 | Resin of bile |
| 34 | 43 | 109 | Myrtle wax (Cadet) |
| 36 | 45 | 112 | Spermaceti (Bostock) |
| 42 | 53 | 127 | Tallow (Nicholson) 92 (Thomson) |
| 49 | 61 | 142 | Bees wax |
| 50 | 63 | 145 | Ambergris (La Grange) |
| | | 150 | Potassium |
| 55 | 79 | 155 | Bleached wax (Nicholson) |
| 75 | 94 | 200 | Sodium perfectly fluid |
| 80 | 100 | 210 | Bismuth 5 parts, tin 3, lead 2,210 (Dalton) |
| | 107 | | Iodine (Gay Lussac) |
| 89 | 111 | 234 | Sulphur (Hope) |
| 90 | 116 | 235 | Adipocire of biliary calculi (Fourcroy) |
| 112 | 140 | 283 | Tin and bismuth, equal parts |
| 120 | 150 | 303 | Camphor |
| 134 | 168 | 334 | Tin 3, lead 2 ; or tin 2, bismuth 1 |
| 182 | 227 | 442 | Tin (Crichton) (413 Irvine) |
| 190 | 238 | 460 | Tin 1, lead 4 |
| 197 | 247 | 476 | Bismuth (Irvine) |
| 214 | 267 | 512 | Tin (Guyton Morveau) |
| 258 | 325 | 612 | Lead (Crichton) (594 Irvine) (540 Newton) |

| *Reaum.* | *Cent.* | *Fahren.* | | *Wedg.* |
|---|---|---|---|---|
| 297 | 371 | 700 | Zinc | |
| 945 | 432 | 809 | Antimony | |
| 1678 | 2100 | 3807 | Brass | 21 |
| 2024 | 2530 | 4587 | Copper | 27 |
| 2082 | 2602 | 4717 | Silver | 28 |
| 2313 | 2780 | 5237 | Gold | 32 |
| 7475 | 9850 | 17977 | Cobalt, cast iron | 130 |
| 9131 | 11414 | 20577 | Nickel | 150 |
| 9325 | 11680 | 21097 | Soft nails | 154 |
| 9602 | 12801 | 21637 | Iron | 158 |
| 9708 | 12136 | 21877 | Manganese | 160 |
| 10280 | 12857 | 23177 | Platina, Tungsten, Molybdena, Uranium, Titanium, &c. | 170+ |
| | | | 3. SOLI S AND LIQUIDS VOLATILIZED. | |
| 29 | 36 | 98 | Ether | |
| 48 | 60 | 140 | Liquid ammonia | |
| 50 | 63 | 145 | Camphor (Venturi) | |
| 61 | 77 | 170 | Sulphur (Kirwan) | |
| 64 | 80 | 176 | Alcohol (174 Black) | |
| 80 | 100 | 212 | Water and essential oils | |
| 82 | 104 | 219 | Phosphorus (Pelletier) | |
| 83 | 110 | 230 | Muriate of lime (Dalton) | |
| 93 | 116 | 242 | Nitrous acid | |
| 96 | 120 | 248 | Nitric acid | |
| 112 | 140 | 283 | White oxide of arsenic? | |
| 226 | 282 | 540 | Arsenic? | |
| 232 | 290 | 554 | Phosphorus in close vessels | |
| 239 | 299 | 570 | Sulphur | |
| 248 | 310 | 590 | Sulphuric acid (Dalton) (546 Black) | |
| 252 | 315 | 600 | Linseed oil, Sulphur (Davy) | |
| 279 | 350 | 660 | Mercury (Dalton) (644 Secondat) (600 Black) | |
| | | | 4. MISCELLANEOUS EFFECTS OF HEAT. | |
| —54 | —68 | —90 | Greatest cold produced by Mr Walker | |
| —36 | —44 | —50 | Natural cold observed at Hudson's Bay | |
| —24 | —30 | —23 | Observed on the surface of the snow at Glasgow, 1780 | |
| —20 | —25 | —14 | At Glasgow 1780 | |
| —14 | —18 | 0 | Equal parts, snow and salt | |
| +5 | +6 | +43 | Phosphorus burns slowly | |
| 12 | 15 | 59 | Vinous fermentation begins | |
| 15 | 18 | 66 | to 135, Animal putrefaction | |
| 19 | 24 | 75 | to 80, Summer heat in Britain | |
| 20 | 25 | 77 | Vinous fermentation rapid, acetous begins | |
| 21 | 26 | 80 | Phosphorus burns in oxygen, (104 Gottling) | |
| 25 | 31 | 88 | Acetification ceases, phosphorus ductile | |
| 28 | 35 | 96 | to 100 Animal temperature | |

| eaum. | Cent. | Fahren. | | Wedg. |
|---|---|---|---|---|
| 33 | 41 | 107 | Feverish heat | |
| 40 | 50 | 122 | Phosphorus burns vividly (Fourcroy) (148 Thomson) | |
| 44 | 54 | 130 | Ammonia disengaged from water | |
| 59 | 74 | 165 | Albumen coagulates (156 Black) | |
| 120 | 150 | 303 | Sulphur burns slowly | |
| | | 600 | Boracium burns | |
| 269 | 335 | 635 | Lowest ignition of iron in the dark | |
| 315 | 384 | 750 | Iron bright in the dark | |
| 341 | 427 | 800 | Hydrogen burns, (1000 Thomson) | |
| 342 | 428 | 802 | Charcoal burns (Thomson) | |
| 380 | 475 | 884 | Iron red in twilight | |
| 448 | 560 | 1050 | Iron red hot in a common fire | |
| 462 | 577 | 1077 | Iron red in day light | 1 |
| 564 | 705 | 1300 | Azotic gas burns | +2 |
| 737 | 986 | 1807 | Enamel colours burned | 6 |
| 1451 | 1814 | 2897 | Diamond burns (Mackenzie) (5000 Morveau) | 14 |
| 2313 | 2780 | 5237 | Settling heat of plate glass | 29 |
| 2880 | 3580 | 6507 | Delft ware fired | 40 |
| 3750 | 4680 | 8480 | Working heat of plate glass | 57 |
| 4450 | 5610 | 10177 | Flint glass furnace | 70 |
| 5370 | 6770 | 12257 | Cream-coloured ware fired | 86 |
| 5800 | 7330 | 13297 | Worcester china vitrified | 94 |
| 6270 | 7850 | 14337 | Stone ware fired | 102 |
| 6520 | 8150 | 14727 | Chelsea china fired | 105 |
| 6925 | 8650 | 15637 | Derby china fired | 112 |
| 7025 | 8770 | 15897 | Flint glass furnace, greatest heat | 114 |
| 7100 | 8880 | 16007 | Bow china vitrified | 121 |
| 7460 | 9320 | 16807 | Plate glass, greatest heat | 124 |
| 7650 | 9600 | 17327 | Smith's forge | 125 |
| 9131 | 11414 | 20577 | Hessian crucible fused | 150 |
| 11106 | 13900 | 25127 | Greatest heat observed | 185 |
| | | | Extremity of Wedgwood | 240 |

*Table of High Degrees of Heat, according to the correction of Wedgwood's scale by Guyton Morveau.*

| Reaum. | Cent. | Fahr. | Wedg. | |
|---|---|---|---|---|
| 215.9 | 269.9 | 517.76 | 0 | Red heat in day light |
| 252.4 | 315.6 | 599.6 | | Linseed oil boils |
| 257.8 | 322.2 | 612. | | Lead melts |
| 271.4 | 339.3 | 642.75 | 2 | Mercury boils |
| 299.2 | 374. | 705.25 | 3 | Zinc melts |
| 382.6 | 478.2 | 892.74 | 6 | Enamels melt |
| 410.2 | 512.9 | 955.23 | 7 | Antimony melts |
| 438.1 | 547.6 | 1017.73 | 8 | Copper 1 and tin 3 melt |
| 465.8 | 582.3 | 1080.23 | 9 | Silver 1 and tin 1 melt |
| 521.8 | 651.8 | 1205.22 | 11 | Copper and tin, equal parts, melt |
| 632.6 | 790.7 | 1455.21 | 15 | Copper 3 and tin 1 melt. |

| *Reaum.* | *Cent.* | *Fahren.* | *Wedg.* | |
|---|---|---|---|---|
| 799.2 | 998.9 | 1836.17 | 21 | Brass melts |
| 827. | 1033.7 | 1892.67 | 22 | Silver melts |
| 965.9 | 1207.3 | 2205.15 | 27 | Copper melts |
| 1104.8 | 1380.9 | 2517.63 | 32 | Gold melts |
| 2715.8 | 3394.7 | 6196.40 | 90 | Iron, sweating heat |
| 2854.7 | 3568.3 | 6508.88 | 95 | Iron, welding heat |
| 3549.1 | 4436.3 | 8071.28 | 120 | Porcelain of China softens |
| 3688. | 4609.9 | 8383.76 | 125 | Smith's forge |
| 3826.9 | 4783.5 | 8696.24 | 130 | Cast iron melts |
| 4243.6 | 5651.5 | 9633.68 | 155 | Porcelain melts |
| 4382.4 | 5825.1 | 10517.12 | 160 | Manganese melts |
| 4821.3 | 5998.7 | 10829.60 | 165 | Heat of Macquer's furnace |
| 4938.0 | 6172.3 | 11142.08 | 170 | Furnace with three blasts |
| 5076.9 | 6345.9 | 11454.56 | 175 | Soft iron melts |
| * | * | * | * | Nickel melts |
| | | | | Platinum melts |

## TABLES,

*Frigorific Mixtures, selected from Mr Walker's Publication,* 1808, *communicated by the Author.*

### Frigorific Mixtures, *without Ice.*

| Mixtures. | Thermometer sinks. | Degr. of cold produced. |
|---|---|---|
| Muriate of ammonia 5 parts<br>Nitrate of potash 5<br>Water - - 16 | From + 50° to + 10° | 40 |
| Sulphate of soda 3 parts<br>Diluted nitric acid 2 | From + 50 to — 3 | 53 |
| Sulphate of soda 6 parts<br>Nitrate of ammonia 5<br>Diluted nitric acid 4 | From + 50 to — 14 | 64 |
| Phosphate of soda 9 parts<br>Nitrate of ammonia 6<br>Diluted nitric acid 4 | From + 50 to — 21 | 71 |

N. B. If the materials are mixed at a *warmer* temperature than that expressed in the table, the effect will be proportionally *greater;* thus, if the most powerful of these mixtures be made when the air is + 85°, it will sink the thermometer to + 2°.

## Frigorific Mixtures, *with Ice.*

| Mixtures. | Thermometer sinks. | Degr. of cold produced. |
| --- | --- | --- |
| Snow, or pounded ice, 2 parts<br>Muriate of soda, 1 | *From any Temperature* to —5° | * |
| Snow, or pounded ice, 12 parts<br>Muriate of soda - 5<br>Nitrate of ammonia 5 | *From any Temperature* to —25 | * |
| Snow 3<br>Diluted sulphuric acid 2 | From +32 to —23 | 55 |
| Snow - - 2 parts<br>Cryst. muriate of lime 3 | From + 32 to — 50 | 82 |

N. B. The reason for the *omissions* in the last column of this table is, the thermometer sinking in these mixtures to the degree mentioned in the preceding column, *and never lower*, whatever may be the temperature of the materials at mixing.

## *Combinations* of Frigorific Mixtures.

| Mixtures. | Thermometer sinks. | Degr. of cold produced. |
| --- | --- | --- |
| Snow - - 3 parts<br>Diluted nitric acid 2 | From 0 to —46 | 46 |
| Snow - - 8 parts<br>Diluted sulphuric acid 3<br>Diluted nitric acid 3 | From —10 to —56 | 46 |
| Snow - - 2 parts<br>Muriate of lime 3 | From —15 to —68 | 53 |
| Snow - - 8 parts<br>Diluted sulphuric acid 10 | From —68 to —91 | 23 |

N. B. The materials in the first column are to be cooled, previously to mixing, to the temperature required, by mixtures taken from either of the preceding tables.

## TABLES OF SIMPLE AFFINITY.

**OXYGEN.**

Carbon
Manganese,
Zinc,
Iron,
Tin,
Antimony,
Hydrogen,
Phosphorus,
Sulphur,
Arsenic,
Nitrogen,
Nickel,
Cobalt,
Copper,
Bismuth,
Caloric ?
Mercury,
Silver,
Arsenious acid,
Nitric oxide,
Gold,
Platinum,
Carbonic oxide,
Muriatic acid,
White oxide of manganese,
White oxide of lead.

**OXYGEN *.**

Titanium,
Manganese,
Zinc,
Iron,
Tin,
Uranium,
Molybdenum,
Tungsten,
Cobalt,
Antimony,
Nickel,
Arsenic,
Chromium,
Bismuth,
Lead,
Copper,
Tellurium,
Platinum,
Mercury,
Silver,
Gold.

**CARBON.**

Oxygen,
Iron,
Hydrogen.

**NITROGEN.**

Oxygen,
Sulphur ?
Phosphorus,
Hydrogen.

**HYDROGEN.**

Chlorine,
Oxygen,
Iodine,
Sulphur,
Carbon,
Phosphorus,
Nitrogen.

**SULPHUR, PHOSPHORUS ?**

Potass,
Soda,
Iron,
Copper,
Tin,
Lead,
Silver,
Bismuth,
Antimony,
Mercury,
Arsenic,
Molybdenum.

**POTASS, SODA, AND AMMONIA.**

*Acids.* Sulphuric,
Nitric,
Muriatic,
Phosphoric,
Fluoric,
Oxalic,
Tartaric,
Arsénic,
Succinic,
Citric,
Lactic,
Benzoic,
Sulphurous,
Acetic,
Mucic.
*Acids.* Boracic,
Nitrous,
Carbonic,
Prussic,
Oil,
Water,
Sulphur.

**BARYTA.**

*Acids.* Sulphuric,
Oxalic,
Succinic,
Fluoric,
Phosphoric,
Mucic,
Nitric,
Muriatic,
Suberic,
Citric,
Tartaric,
Arsénic,
Lactic,
Benzoic,
Acetic,
Boracic,
Sulphurous,
Nitrous,
Carbonic,
Prussic,
Sulphur,
Phosphorus,
Water,
Fixed oil.

**STRONTIA.**

*Acids.* Sulphuric,
Phosphoric,
Oxalic,
Tartaric,
Fluoric,
Nitric,
Muriatic,
Succinic,
Acetic,
Arsénic,
Boracic,
Carbonic,
Water.

**LIME.**

*Acids.* Oxalic,
Sulphuric.
*Acids.* Tartaric,
Succinic,
Phosphoric,
Mucic,
Nitric,
Muriatic,
Suberic,
Fluoric,
Arsenic,
Lactic,
Citric,
Malic,
Benzoic,
Acetic,
Boracic,
Sulphurous,
Nitrous.
Carbonic,
Prussic,
Sulphur,
Phosphorus,
Water,
Fixed oil.

**MAGNESIA.**

*Acids.* Oxalic,
Phosphoric,
Sulphuric,
Fluoric,
Arsenic,
Mucic,
Succinic,
Nitric,
Muriatic,
Tartaric,
Citric,
Malic ?
Lactic,
Benzoic,
Acetic,
Boracic,
Sulphurous,
Nitrous,
Carbonic,
Prussic,
Sulphur.

**ALUMINA.**

*Acids.* Sulphuric,
Nitric,
Muriatic,
Oxalic.

* Vauquelin's table of the affinity of the metals for oxygen, according to the difficulty with which their oxides are decomposed by heat.

*Tables of Simple Affinity.—continued.*

*Acids.* Arsenic,
Fluoric,
Tartaric,
Succinic,
Mucic,
Citric.
Phosphoric,
Lactic,
Benzoic,
Acetic,
Boracic
Sulphurous,
Nitrous,
Carbonic,
Prussic.

---

SILICA.
*Acid.* Fluoric,
Potass.

---

OXIDE OF PLATINUM.
OXIDE OF GOLD *.
*Acids.* Gallic,
Muriatic,
Nitric,
Sulphuric,
Arsénic,
Fluoric,
Tartaric,
Phosphoric,
Oxalic,
Citric,
Acetic,
Succinic,
Prussic,
Carbonic,
Ammonia.

---

OXIDE OF SILVER.
*Acids.* Gallic,
Muriatic,
Oxalic,
Sulphuric,
Mucic,
Phosphoric,
Sulphurous,
Nitric.
Arsenic,
Fluoric,
Tartaric,
Citric,
Lactic,
Succinic,
Acetic,
Prussic.

---

*Acids.* Carbonic,
Ammonia.

---

OXIDE OF MERCURY.
*Acids.* Gallic,
Muriatic,
Oxalic,
Succinic
Arsénic,
Phosphoric,
Sulphuric,
Mucic,
Tartaric,
Citric,
Malic,
Sulphurous,
Nitric,
Fluoric,
Acetic,
Benzoic,
Boracic,
Prussic,
Carbonic.

---

OXIDE OF LEAD.
*Acids.* Gallic,
Sulphuric,
Mucic,
Oxalic,
Arsenic,
Tartaric,
Phosphoric,
Muriatic,
Sulphurous,
Suberic,
Nitric,
Fluoric,
Citric,
Malic,
Succinic,
Lactic,
Acetic,
Benzoic,
Boracic,
Prussic,
Carbonic,
Fixed oils,
Ammonia.

---

OXIDE OF COPPER.
*Acids.* Gallic.
Oxalic,
Tartaric,
Muriatic,
Sulphuric.

---

*Acids.* Mucic,
Nitric,
Arsénic,
Phosphoric,
Succinic,
Fluoric,
Citric,
Lactic,
Acetic,
Boracic,
Prussic,
Carbonic,
Fixed alkalis,
Ammonia,
Fixed oils.

---

OXIDE OF ARSENIC.
*Acids.* Gallic,
Muriatic,
Oxalic,
Sulphuric,
Nitric,
Tartaric,
Phosphoric,
Fluoric,
Succinic,
Citric,
Acetic,
Prussic,
Fixed Alkalis,
Ammonia,
Fixed oils,
Water.

---

OXIDE OF IRON.
*Acids.* Gallic,
Oxalic,
Tartaric,
Camphoric,
Sulphuric,
Mucic,
Muriatic,
Nitric,
Phosphoric,
Arsenic,
Fluoric,
Succinic,
Citric,
Lactic,
Acetic,
Boracic,
Prussic,
Carbonic.

---

OXIDE OF TIN †.
*Acids.* Gallic,
Muriatic,
Sulphuric,
Oxalic,
Tartaric,
Arsenic,
Phosphoric,
Nitric,
Succinic,
Fluoric,
Mucic,
Citric,
Lactic,
Acetic,
Boracic,
Prussic,
Ammonia.

---

OXIDE OF ZINC.
*Acids.* Gallic,
Oxalic,
Sulphuric,
Muriatic,
Mucic,
Nitric,
Tartaric,
Phosphoric,
Citric,
Succinic,
Fluoric,
Arsenic,
Lactic,
Acetic,
Boracic,
Prussic,
Carbonic,
Fixed Alkalies.
Ammonia.

---

OXIDE OF ANTIMONY.
*Acids.* Gallic,
Muriatic,
Benzoic,
Oxalic,
Sulphuric,
Nitric,
Tartaric,
Mucic,
Phosphoric,
Citric,
Succinic,
Fluoric,
Arsenic,
Lactic.

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* Omitting the oxalic, citric, succinic, and carbonic, and adding sulphuretted hydrogen after ammonia.

† Bergman places the tartaric before the muriatic.

*Tables of Simple Affinity,—continued.*

| | | | |
|---|---|---|---|
| *Acids.* Acetic, | Ammonia, | Potass, | Ammonia, |
| Boracic, | Magnesia, | Soda, | Baryta, |
| Prussic, | Glucina, | Ammonia, | Lime, |
| Fixed alkalis. | Alumina, | Glucina, | Magnesia, |
| Ammonia. | Zirconia, | Alumina, | Alumina. |
| | Metallic Oxides, | Zirconia, | |
| SULPHURIC ACID. | Silica. | Silica. | CAMPHORIC ACID. |
| PRUSSIC *. | | | Lime, |
| Baryta, | PHOSPHOROUS ACID §. | ACETIC ACID. | Potass, |
| Strontia, | Lime, | LACTIC. SUBERIC. | Soda, |
| Potass, | Baryta, | Baryta, | Baryta, |
| Soda, | Strontia, | Potass, | Ammonia, |
| Lime, | Potass, | Soda. | Alumina, |
| Magnesia, | Soda, | Strontia, | Magnesia. |
| Ammonia, | Ammonia, | Lime. | |
| Glucina, | Glucina, | Ammonia, | FIXED OILS. |
| Gadolina, | Alumina, | Magnesia, | Lime, |
| Alumina, | Zirconia, | Metallic Oxides, | Baryta, |
| Zirconia, | Metallic Oxides. | Glucina, | Potass, |
| Metallic Oxides. | | Alumina, | Soda, |
| | NITRIC ACID. | Zirconia. | Magnesia, |
| SULPHUROUS ACID. | MURIATIC ‖. | | Oxide of mercury |
| SUCCINIC †. | Baryta, | OXALIC ACID. | Other metallic |
| Baryta, | Potass, | TARTARIC. | oxides, |
| Lime, | Soda, | CITRIC ††. | Alumina. |
| Potass, | Strontia, | Lime, | |
| Soda, | Lime, | Baryta, | ALKOHOL. |
| Strontia, | Magnesia, | Strontia, | Water. |
| Magnesia, | Ammonia, | Magnesia, | Ether, |
| Ammonia, | Glucina, | Potass, | Volatile oil, |
| Glucina, | Alumina, | Soda, | Alkaline sulphu- |
| Alumina, | Zirconia, | Ammonia, | rets. |
| Zirconia, | Metallic Oxides. | Alumina, | |
| Metallic Oxides. | | Metallic Oxides, | SULPHURETTED |
| | FLUORIC ACID. | Water, | HYDROGEN. |
| PHOSPHORIC ACID. | BORACIC ¶. | Alkohol. | Baryta, |
| CARBONIC ‡. | ARSENIC **. | | Potass, |
| Baryta. | TUNGSTIC. | BENZOIC ACID. | Soda, |
| Strontia, | Lime, | White oxide of | Lime, |
| Lime, | Baryta, | arsenic, | Ammonia, |
| Potass, | Strontia, | Potass, | Magnesia, |
| Soda, | Magnesia. | Soda. | Zirconia. |

* With the omission of all after ammonia.

† Ammonia should come before magnesia; and strontia, glucina, and zirconia, should be omitted.

‡ Magnesia should stand above ammonia, and alumina and silica should be omitted.

§ Ammonia should stand above magnesia.

‖ Silica should be omitted, and, instead of it, water and alkohol be inserted.

¶ Except silica.

** With the omission of strontia, metallic oxides, glucina, and zirconia.

†† Zirconia after alumina.

*Relative Attractions at the lowest temperature of Visible Ignition, by Sir H. Davy.*

| OXYGEN. | CHLORINE. | SULPHUR. | PHOSPHORUS. |
|---|---|---|---|
| Potassium | Potassium | Potassium | Potassium |
| Sodium | Sodium | *Sodium* | *Sodium* |
| Barium | Zinc | Iron | Platinum |
| Boron | Iron | Copper | Zinc |
| Carbon | Lead | Palladium | Antimony |
| Manganesum | Silver | Lead | Sulphur. |
| Zinc | Antimony | *Silver* | |
| Iron | Bismuth | | |
| Tin | Phosphorus | | |
| Phosphorus | Copper | | |
| Antimony | Sulphur | | |
| Bismuth | Mercury | | |
| Lead | Platinum | | |
| Sulphur | Gold | | |
| Arsenic | | | |
| Tungstenum | | | |
| Azote | | | |
| Palladium | | | |
| Mercury | | | |
| Silver | | | |
| Gold | | | |
| Platinum | | | |

## *Cases of Mutual Decomposition.*

### 1. FROM SIMPLE AFFINITY.

| | | |
|---|---|---|
| Sulphate of potass | with | Muriate of baryta |
| ——— soda | — | Nitrate of potass |
| ——— ammonia | — | Muriate of potass |
| ——— magnesia | — | Carbonate of potass |
| Supersulphate of alumina | — | Muriate of lime |
| Nitrate of potass | — | ——— baryta |
| ——— ammonia | — | Phosphate of soda |
| Muriate of baryta | — | All the sulphates and nitrates |
| ——— soda | — | Carbonate of potass |
| ——— lime | — | Sub-borate of soda |
| ——— ammonia | — | Carbonate of potass |
| Phosphate of soda | — | Muriate of ammonia |
| Sub-borate of soda | — | Carbonate of potass |
| Nitrate of silver | — | Muriate of soda |
| Acetate of lead | — | Citrate of potass |
| Sulphate of mercury | — | Muriate of soda |
| Soap of potass | — | ——— soda |
| ——— soda | — | Sulphate of lime |

2. FROM COMPOUND AFFINITY.

| | | |
|---|---|---|
| Sulphate of baryta | with | Carbonate of potass |
| ——— baryta | — | ——— soda |
| ——— potass | — | Muriate of lime |
| ——— soda | — | Ditto |
| Muriate of baryta | — | Phosphate of soda |
| Ditto | — | Sub borate of soda |
| Ditto | — | Carbonate of potass |
| Ditto | — | ——— soda |
| Ditto | — | ——— ammonia |
| Muriate of lime | — | ——— ammonia |
| Phosphate of soda | — | ——— lime |
| Acetate of lead | — | Sulphate of zinc |
| Ditto | — | Nitrate of mercury. |

*Cases of Disposing Affinity.*

The formation of water by the action of the sulphuric acid on the compound oxides.

The oxidation of metals by water, in consequence of the presence of an acid.

*Table of Incompatible Salts* *.

| SALTS | INCOMPATIBLE WITH |
|---|---|
| 1. Fixed alkaline sulphates | Nitrates of lime and magnesia<br>Muriates of lime and magnesia |
| 2. Sulphate of lime | Alkalies<br>Carbonate of magnesia<br>Muriate of barytes |
| 3. Alum | Alkalies<br>Muriate of barytes<br>Nitrate, muriate, carbonate of lime<br>Carbonate of magnesia |
| 4. Sulphate of magnesia | Alkalies<br>Muriate of barytes<br>Nitrate and muriate of lime |
| 5. Sulphate of iron | Alkalies<br>Muriate of barytes<br>Earthy carbonates |
| 6. Muriate of barytes | Sulphates<br>Alkaline carbonates<br>Earthy carbonates. |

* That is, salts which cannot exist together in solution, without mutual decomposition.

| SALTS | INCOMPATIBLE WITH |
|---|---|
| 7. Muriate of lime | Sulphates, except of lime<br>Alkaline carbonates<br>Carbonate of magnesia |
| 8. Muriate of magnesia | Alkaline carbonates<br>Alkaline sulphates |
| 9. Nitrate of lime | Alkaline carbonates<br>Carbonates of magnesia and alumina<br>Sulphates, except of lime |

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*Table of the Specific Heats of equal Weights of some Bodies compared with Water.*

| | *Crawford.* | *Dalton's hypothesis.* | *De La Roche and Berard.* |
|---|---|---|---|
| Water | 1.000 | 1.000 | 1.000 |
| Atmospheric air | 1.790 | 1.759 | 0.2669 |
| Hydrogen gas | 21.400 | 9.382 | 3.2936 |
| Carbonic acid gas | 1.045 | 0.491 | 0.2210 |
| Oxygen gas | 4.749 | 1.333 | 0.2361 |
| Azotic gas | 0.793 | 1.866 | 0.2754 |
| Nitrous oxide | | 0.549 | 0.2369 |
| Nitrous gas | | 0.777 | |
| Olefiant gas | | 1.555 | 0.4207 |
| Carbonic oxide gas | | 0.777 | 0.2884 |
| Steam | | 1.166 | 0.8470 |
| Ammoniacal gas | | 1.555 | |
| Carburetted hydrogen | | 1.333 | |
| Nitric acid gas | | 0.491 | |
| Sulphuretted hydrogen | | 0.583 | |
| Muriatic acid gas | | 0.424 | |
| Ether vapour | | 0.848 | |
| Alcohol vapour | | 0.586 | |

*Colour of the Precipitates thrown down from Metallic Solutions by various Re-agents. Henry.*

| Metal. | Prussiated Alkalies. | Tincture of Galls. | Water impregnated with Sulphuretted Hydrogen. | Hydrosulphurets. |
|---|---|---|---|---|
| Gold | Yellowish-white | Solution turned green, precipitate brown of reduced gold | Yellow | Yellow |
| Platina | No precipitate but an orange one by prussiate of mercury | Dark green, becoming paler | Precipitated in a metallic state | |
| Silver | White | Yellowish-brown | Black | Black |
| Mercury | White changing to yellow | Orange-yellow | Black | Brownish-black |
| Palladium | Olive * deep orange † | | Dark brown | Dark brown |
| Rhodium | No precipitate | | | No precipitate |
| Iridium | None; colour discharged | None; colour discharged | | |
| Osmium | | Purple changing to vivid blue | | |
| Copper | Bright reddish-brown | Brownish | Black | Black |
| Iron 1 green salts | White changing to blue | No precipitate | Not precipitated | Black |
| Iron 2 red salts | Deep blue | Black | | |
| Nickel | Green | Greyish-white | Not precipitated | Black |
| Tin | White | No precipitate | Brown | Black |
| Lead | White | White | Black | Black |
| Zinc | White | No precipitate | Yellow | White |
| Bismuth | White | Orange | Black | Black |
| Antimony | White | A white oxide from dilution | Orange | Orange |
| Tellurium | No precipitate | Yellow | | Blackish |
| Arsenic | White | Little change | Yellow | Yellow |
| Cobalt | Brownish-yellow | Yellowish-white | Not precipitated | Black |
| Manganese | Yellowish-white | No precipitate | Not precipitated | White |
| Chrome | Green | Brown | | Green |
| Molybdena | Brown | Deep brown | Brown | |
| Uranium | Brownish-red | Chocolate | | Brownish-yellow |
| Tungsten | | | | |
| Titanium | Grass-green with some brown | Reddish-brown | Not precipitated | Grass-green |
| Columbium | Olive | Orange | | Chocolate |
| Tantalium | | | | |
| Cerium | | Yellowish | | Brown, becoming deep-green |

* Chenevix † Wollaston

*Table of the Solubility of Saline and other Substances, in* 100 *parts of Water, at the temperature of* 60° *and* 212°

| | 60° | 212° |
|---|---|---|
| ACIDS. | | |
| Sulphuric | unlimited | unlimited |
| Nitric | do | do |
| Acetic | do | do |
| Prussic | do | do |
| Phosphoric, Tartaric, Malic, Lactic, Laccic — very soluble | | |
| Arsenic | 150 | |
| Arsenious acid | 1.25 | 6. |
| Citric | 133 | 200 |
| Oxalic | 50 | 100 |
| Gallic | 8.3 | 66 |
| Boracic | 2.8 | 8 |
| Mucic | 0.84 | 1.25 |
| Succinic | 4 / 1.04 | 50 |
| Suberic | 0.69 | 50 |
| Camphoric | 1.04 | 8.3 |
| Benzoic | 0.208 | 4.17 |
| Molybdic | | 0.1 |
| Chromic, unknown | | |
| Tungstic, insoluble | | |
| SALIFIABLE BASES. | | |
| Potass | 50 | more |
| Soda, somewhat less than potass | | |
| Baryta | 5 | 50 |
| —— crystallized | 57 | unlimited |
| Strontia | 0.6 | |
| —— crystallized | 1.9 | 50 |
| Lime | 0.2 | |
| SALTS. | | |
| Sulphate of potass | 6.25 | 20 |
| Supersulphate of potass | 50 | 100+ |
| Sulphate of soda | 37.4 | 125 |
| —— ammonia | 50 | 100 |
| —— magnesia | 100 | 133 |
| —— alumina, very soluble, proportion unknown | | |
| Supersulphate of alumina and potass / —— ammonia — alum | 5 | 133 |
| Nitrate of baryta | 8 | 25 |
| —— potass | 14.25 | 100+ |
| —— soda | 33 | 100 |

| | *Temperature* 60° | 212° |
|---|---|---|
| Nitrate of strontia | 100 | 200 |
| ——— lime | 400 | any quantity |
| ——— ammonia | 50 | 200 |
| ——— magnesia | 100 | 100+ |
| Muriate of baryta | 20 | |
| ——— potass | 33 | |
| ——— soda | 35.42 | 36.16 |
| ——— strontia | 150 | any quantity |
| ——— lime | 200 | |
| ——— ammonia | 33 | 100 |
| ——— magnesia | 100 | |
| Oxymuriate of potass | 6 | 40 |
| Phosphate of potass, very soluble | | |
| ——— soda | 25 | 50 |
| ——— ammonia | 25 | 25+ |
| ——— magnesia | 6.6 | |
| Sub-borate of soda | 8.4 | 50. |
| Carbonate of potass | 25 | 83.3 |
| ——— soda | 50 | 100+ |
| ——— magnesia | 2 | |
| ——— ammonia | 50+ | 100 |
| Acetate of potass | 100 | |
| ——— soda | 35 | |
| ——— ammonia, very soluble | | |
| ——— magnesia, ditto | | |
| ——— strontia | | 40.8 |
| Supertartrate of potass | 1.67 | 3.3 |
| Tartrate of potass | 25 | |
| ——— and soda | 25 | |
| Oxalate of potass | 33 | |
| ——— ammonia | 4.5 | |
| Superoxalate of potass | | 10 |
| Citrate of potass, very soluble | | |
| Prussiate of potass and iron | | |
| Nitrate of silver, very soluble | | |
| Muriate of mercury (corrosive sublimate) | 5 | 50 |
| Sulphate of copper | 25 | 50 |
| Acetate of copper, very soluble | | |
| Sulphate of iron | 50 | 133 |
| Muriate of iron, very soluble | | |
| Tartrate of iron and potass | | |
| Acetate of mercury | | |
| Sulphate of zinc | 44 | 44+ |
| Acetate of zinc, very soluble | | |
| ——— of lead (Ed. Pharm.) Bostock | 27 | |
| ——— as it exists in Goulard's extract, more sol. | | |
| Tartrate of antimony and potass, Duncan | 6.6 | 33 |
| Alkaline soaps, very soluble | | |
| Sugar | 100 | any quantity |

| | *Temperatures* 60° | 212° |
|---|---|---|
| Gum, very soluble | | |
| Starch | 0 | very soluble |
| Jelly | sparingly | abundantly |
| Gelatine | soluble | more so |
| Urea, very soluble | | |
| Cinchonin | | |

*Salts not soluble in* 100 *times their Weight of Water.*

Sulphates of baryta, strontia, and lime, and subsulphate of mercury.
Phosphates of baryta, strontia, lime, magnesia, and mercury.
Fluate of lime.
Carbonates of baryta, strontia, and lime.
Muriates of lead and silver, and submuriate of mercury (Calomel).
Subacetate of copper.

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*Solubility of Saline and other Substances in* 100 *parts of Alcohol, at the temperature of* 176°

All the acids, except the sulphuric, nitric, and oxymuriatic, which decompose it, and the phosphoric and metallic acids.
Potass, soda, and ammonia, very soluble.
Red sulphate of iron.

| | |
|---|---|
| Muriate of iron | 100 |
| ——— lime | 100 |
| Nitrate of ammonia | 89.2 |
| Muriate of mercury | 88.3 |
| Camphor | 75. |
| Nitrate of silver | 41.7 |
| Refined sugar | 24.6 |
| Muriate of ammonia | 7.1 |
| Arseniate of potass | 3.75 |
| Nitrate of potass | 2.9 |
| Arseniate of soda | 1.7 |

Muriate of soda (Mr Chenevix). Alkaline soaps. Magnesian do. Extractive. Tannin. Volatile oils. Adipocire. Resins. Urea. Cinchonin.

*Substances insoluble in Alcohol.*

Earths.
Phosphoric and metallic acids.
Almost all the sulphates and carbonates.
The nitrates of lead and mercury.
The muriates of lead, silver and soda.
The sub-borate of soda.
The tartrate of soda and potass, and the supertartrate of potass.
Fixed oils, wax and starch.
Gum, caoutchouc, suber, lignin, gelatin, albumen, and fibrin.

*Table of the Solubility of Fats in* 100 *parts of alcohol and sulphuric ether. By P. F. G. Boullay.*

| | Alcohol, sp. gr. 0.828. 48 Fahr. | Alcohol, sp. gr. 0.828. 74 boiling. | Ether. 48 Fahr. |
|---|---|---|---|
| Hogs lard | 1.04 | 1.74 | 25 |
| Mutton suet | 0.69 | 1.39 | 10 |
| Spermaceti | 1.39 | 8.33 | 20 |

*Table of the Solubility of Fixed Fluid Oils in* 100 *parts of Alcohol and Acetic Ether at* 55° *Fahr. By L. A. Planche.*

| | Alcohol sp. gr. 0.28. | Acetic Ether. |
|---|---|---|
| Castor oil | every proportion. | 800 and upwards. |
| Poppy seed oil, a year old | 0.8 | |
| Linseed oil | 0.6 | 50. |
| Walnut oil | 0 6 | 50. |
| Poppy seed oil, new | 0.4 | 33. |
| Beech mast oil | 0.4 | 40. |
| Olive oil | 0.3 | 20. |
| Oil of sweet almonds | 0.3 | 25. |
| Oil of bitter almonds | 0.3 | |
| Nut oil | 0.3 | 14. |

*Proportion of Oil and Suet in various Fats according to Braconnot.*

| | *Oil.* | *Suet.* |
|---|---|---|
| Melted butter, summer | 60 | 40 |
| ——— winter | 35 | 65 |
| Hogs lard | 62 | 38 |
| Beef marrow | 24 | 76 |
| Mutton marrow | 74 | 26 |
| Goose grease | 72 | 32 |
| Turkey grease | 74 | 26 |
| Olive oil | 72 | 28 |
| Oil of almonds | 76 | 24 |
| ——— colsa | 54 | 46 |

| | | |
|---|---|---|
| Sulphate of soda | 89.1 | = 50 *acid* + 39.1 *soda* |
| Liquid nitric acid sp. gr. 1.50; | 90.2 | = 67.54 *nit. ac.* + 22.64 *wat.* |
| Muriate of potash | 93.2 | = 34.1 *acid* + 59.1 *potash* |
| Barytes | 97 | |
| Nitrate of lime | 103 | = 67.5 *acid* + 35.5 *lime* |
| Bicarbonate of soda | 105.5 | = 27.5 *ac.* + 66.6 *car. soda* + 11.3 *wat.* |
| Nitrate of soda | 106.6 | = 67.5 *acid* + 39.1 *soda* |
| Selenite - | 108.1 | = 85.5 *s. of lime* + 22.4 *water* |
| Sulphate of potash | 109.1 | = 50 *acid* + 59.1 *potash* |
| Sulphate of strontia | 119.0 | = 50 *acid* + 69 *stront.* |
| Carbonate of barytes | 124.5 | = 27.5 *acid* + 97 *barytes* |
| Bicarbonate of potash - | 125.5 | = 27.5 *acid* + 86. *sub. pot.* + 11.3 *wat.* |
| Mercury - | 125.5 | |
| Nitrate of potash | 126.6 | = 67.54 *acid* + 59.1 *potash* |
| Lead - | 129.5 | |
| Muriate of barytes | 131 | = 34 *acid* + 97 *barytes* |
| Silver - | 135 | |
| Red oxide of mercury - | 135.5 | = 10 *ox.* + 125.5 *merc.* |
| Litharge - | 139.5 | = 10 *ox.* + 129.5 *lead* |
| Oxide of silver | 145 | = 10 *ox.* + 135 *silver* |
| Sulphate of barytes | 147. | = 50 *acid* + 97 *barytes* |
| Binoxalate of potash | 153.0 | = 94 *acid* + 59 *potash* |
| Hyperoxymuriate of potash - | 153.2 | = 93.2 *mur. pot.* + 60 *ox.* |
| Cryst. muriate of barytes - | 153.6 | = 131 *mur. bar.* + 22.6 *wat.* |
| Sulphate of magnesia | 153.9 | = 74.6 *sul. mag.* + 79.3 *water* |
| Sulphate of copper | 156.6 | = 50 *acid* + 50 *cop.* + 56.6 *water* |
| Nitrate of barytes | 164.5 | = 67.5 *acid* + 97 *barytes* |
| Carbonate of lead | 167 | = 27 5 *acid* + 139.5 *lead* |
| Corrosive sublimate | 170.1 | = 34.1 *acid* + 10 *ox.* + 125 5 *merc.* |
| Muriate of lead | 173.6 | = 34.1 *acid* + 139.5 *lead* |
| Sulphate of iron | 173.8 | = 50 *acid* + 34 5 *iron* + 79.3 *water* |
| Phosphate of lead | 176.9 | = 37.4 *acid* + 139.5 *lead* |
| Muriate of silver | 179.1 | = 34.1 *acid* + 145 *silver* |
| Sulphate of zinc | 180.2 | = 50 *acid* + 51 *zinc* + 79.3 *water* |
| Oxalate of lead | 186.5 | = 47 *acid* + 139.5 *lead* |
| Sulphate of lead | 189.5 | = 50 *acid* + 139.5 *lead* |
| Sulphate of soda | 202.3 | = 50 *acid* + 39.1 *soda* + 113.2 *water* |
| Nitrate of lead | 207.0 | = 67.5 *acid* + 139.5 *lead* |
| Protoxide of mercury | 261. | = 10 *ox.* + 251 *merc.* |
| Calomel - | 296.1 | = 34.1 *acid* + 10 *ox.* + 251 *merc.* |

### *Composition of some Organic Bodies, according to Berzelius.*

| | Oxyg. | | Hydr. | | Carb. | Oxyg. | Hydr. | Carb. | Capacity of saturation. |
|---|---|---|---|---|---|---|---|---|---|
| Benzoic acid | 1 *o* | + | 3 *h* | + | 5 *c* | 20.02 | 5.27 | 74.71 | 6.69 |
| Gallic acid | 1 *o* | | 2 *h* | | 2 *c* | 38.02 | 5.02 | 56.96 | 12 34 |
| Tannin from galls | 2 *o* | | 3 *h* | | 3 *c* | 45 00 | 4.45 | 50.55 | 3.718 |
| Succinic acid | 3 *o* | | 4 *h* | | 4 *c* | 47.923 | 4.218 | 47.859 | 15.9743 |
| Acetic acid | 3 *o* | | 6 *h* | | 4 *c* | 46.934 | 6.195 | 46.871 | 15.63 |
| Sugar of milk | 4 *o* | | 8 *h* | | 5 *c* | 48.348 | 6.385 | 45.267 | |
| Sugar | 10 *o* | | 21 *h* | | 12 *c* | 49.083 | 6.802 | 44.115 | 9.98 |
| Potatoe starch | 6 *o* | | 13 *h* | | 7 *c* | 49.583 | 7.090 | 43.327 | |
| Gum Arabic | 12 *o* | | 24 *h* | | 13 *c* | 51.456 | 6.792 | 41.752 | |
| Citric acid | 1 *o* | | 1 *h* | | 1 *c* | 55.096 | 3.634 | 41.270 | 13.585 |
| Tartaric acid | 5 *o* | | 5 *h* | | 4 *c* | 59.200 | 3.912 | 36.888 | 11.976 |
| Saclactic acid | 4 *o* | | 5 *h* | | 3 *c* | 60.818 | 5.018 | 34.164 | 7.6 |
| Oxalic acid * | 6 *o* | | 1 *h* | | 4 *c* | 66.534 | 0.244 | 33.222 | 22. |

* Oxalic acid 3 *o* + 1 *h* + 2 *c* 64.739 2.848 32.413 Dr Thomson.

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### *Composition of some Organic Bodies, according to Gay-Lussac and Thenard.*

| | Carbon. | Oxygen. | Hydrogen. | Nitrogen. |
|---|---|---|---|---|
| Wax | 81.79 | 5.54 | 12.67 | |
| Olive oil | 77.21 | 9.43 | 13.36 | |
| Copal | 76.81 | 10.61 | 12.58 | |
| Rosin | 75.94 | 13 34 | 10.72 | |
| Oak wood | 52.53 | 41.78 | 5.69 | |
| Beech wood | 51.45 | 42.73 | 5.82 | |
| Fecula | 43.55 | 49.68 | 6.77 | |
| Sugar | 42.47 | 50.63 | 6.90 | |
| Gum Arabic | 44 23 | 50.84 | 6.93 | |
| Sugar of milk | 38.825 | 53.834 | 7.341 | |
| Acetic acid | 50.22 | 44.15 | 5.63 | |
| Citric acid | 33.81 | 59.86 | 6.33 | |
| Tartaric acid | 24.05 | 69.32 | 6.53 | |
| Mucous acid | 33.69 | 62.67 | 3.62 | |
| Oxalic acid | 26.57 | 70.69 | 2.74 | |
| Gelatin | 47.881 | 27.207 | 7.914 | 16.998 |
| Albumen | 52.883 | 23.872 | 7.540 | 15.705 |
| Fibrin | 53.360 | 19.865 | 7.021 | 19.934 |
| Cheese | 59.781 | 11.409 | 7.429 | 21.381 |

*Table of the Absorption of Gases by 100 Parts of Water at 60° F.*

| | Volume. | |
|---|---|---|
| Nitric acid - - - - | 361000. | |
| Muriatic acid - - - | 51500. | Thomson |
| Ammonia - - - - | 47500. | Davy |
| ——— - - | 78000. | Thomson |
| Sulphurous acid - - | 12109. | Fourcroy |
| ——— - - - | 3300. | Thomson |
| ——— - - - | 1440. | Priestley |
| Carbonic acid - - - | 108. | Henry |
| Sulphuretted hydrogen - - | 108. | Henry |
| Nitrous oxide - - - - | 86. | Henry |
| Olefiant gas - - - - | 12.5 | Dalton |
| Nitric oxide - - - - | 5. | Henry |
| Oxygen - - - - - | 3.7 | Henry |
| Phosphuretted hydrogen - - | 2.14 | Henry |
| Carbonic oxide - - - | 2.01 | Henry |
| Hydrogen - - - - | 1.61 | Henry |
| Nitrogen - - - - | 1.53 | Henry |
| Carburetted hydrogen - - | 1.40 | Henry |

*Table of Efflorescent Salts (Cadet de Vaux).*

| 288 grains of | in days | lost grains |
|---|---|---|
| Sulphate of soda - | 61 - | 203 |
| Phosphate of soda - | 39 - | 91 |
| Carbonate of soda - | 51 - | 86 |

*Table of Deliquescent Salts (Cadet de Vaux).*

| 288 grains of | in days | absorbed |
|---|---|---|
| Acetate of potass - - | 146 - | 700 |
| Muriate of lime - - | 124 - | 684 |
| ——— manganese - | 105 - | 629 |
| Nitrate of manganese - | 89 - | 527 |
| ——— zinc - - | 124 - | 495 |
| ——— lime - - | 147 - | 448 |
| Muriate of magnesia - | 139 - | 441 |
| Nitrate of copper - - | 128 - | 397 |
| Muriate of antimony - | 124 - | 388 |
| ——— alumina - | 149 - | 342 |
| Nitrate of alumina - | 147 - | 300 |
| Muriate of zinc - - | 76 - | 294 |
| Nitrate of soda - - | 137 - | 257 |
| ——— magnesia - | 73 - | 207 |
| Acetate of alumina - - | 104 - | 202 |
| Supersulphate of alumina - | 121 - | 202 |
| Muriate of bismuth - - | 114 - | 174 |
| Superphosphate of lime - | 93 - | 165 |
| Muriate of copper - - | 119 - | 148 |

*Table of Chemical Equivalents by Dr Wollaston.*

| | | | | | |
|---|---|---|---|---|---|
| Hydrogen - | 1.32 | | | | |
| Carbon - | 7.54 | | | | |
| Oxygen - | 10. | | | | |
| Water - | 11.32 | = | 10 *ox.* | + | 1.32 *hyd.* |
| Phosphorus - | 17.40 | | | | |
| Azote - | 17.54 | | | | |
| Sulphur - | 20. | | | | |
| Ammonia - | 21.5 | = | 17.54 *az.* | + | 3.96 *hyd.* |
| Magnesia - | 24.6 | = | 10 *ox.* | + | 14.6 *mag.* |
| Calcium - | 25.46 | | | | |
| Carbonic acid - | 27.54 | = | 20 *ox.* | + | 7.54 *carb.* |
| Sodium - | 29.1 | | | | |
| Muriatic acid, (dry) | 34.1 | | | | |
| Iron, - | 34.5 | | | | |
| Lime - - | 35.46 | = | 10 *ox.* | + | 25.46 *calc.* |
| Phosphoric acid | 37.4 | = | 20 *ox.* | + | 17.4 *phos.* |
| Nitrous gas - | 37.54 | = | 20 *ox.* | + | 17.54 *az.* |
| Soda - | 39.1 | = | 10 *ox.* | + | 29.1 *sod.* |
| Copper - - | 40. | | | | |
| Zinc - | 41. | | | | |
| Chlorine - | 44.1 | = | 10 *ox.* | + | 34.1 *mur. acid.* |
| Green oxide of iron | 44.5 | = | 10 *ox.* | + | 34.5 *ir.* |
| Muriatic gas - | 45.42 | = | 44.1 *chl.* | + | 1.32 *hyd.* |
| Oxalic acid - | 47.0 | | | | |
| Subcarbonate of ammonia - | 49.0 | = | 27.5 *acid* | + | 21.5 *am.* |
| Potassium - | 49.1 | | | | |
| Red oxide of iron | 49.5 | = | 15 *ox.* | + | 34.5 *iron.* |
| Sulphuric acid (dry) | 50. | = | 30 *ox.* | + | 20 *sulph.* |
| Black oxide of copper | 50. | = | 10 *ox.* | + | 40 *copper* |
| Oxide of zinc - | 51. | = | 10 *ox.* | + | 41 *zinc* |
| Potash - | 59.1 | = | 10 *ox.* | + | 49.1 *pot.* |
| Sulphuric acid sp. gr. 1.85; - | 61.32 | = | 50 *sul. ac.* | + | 11.32 *wat.* |
| Carbonate of lime | 63. | = | 27.54 *carb. ac.* | + | 35.46 *lime* |
| Subcarbonate of soda | 66 6 | = | 27.5 *carb. ac.* | + | 39.1 *soda* |
| Muriate of ammonia | 66.9 | = | 34.1 *acid* + 21.5 *am.* | + | 11.32 *wat.* |
| Nitric acid (dry) | 67.54 | = | 50 *ox.* | + | 17.54 *az.* |
| Strontia - | 69. | | | | |
| Muriate of lime | 69.6 | = | 34.1 *acid* | + | 35.5 *lime* |
| Muriate of soda | 73.2 | = | 34.1 *acid* | + | 39.1 *soda* |
| Sulphate of magnesia | 74.6 | = | 50. *acid* | + | 24.6 *magn.* |
| Bicarbonate of ammonia - - | 76.5 | = | 27.5 *carb. ac.* | + | 49. *subcarb.* |
| Sulphate of lime | 85.5 | = | 50 *acid* | + | 35.5 *lime* |
| Subcarbonate of potash - | 86. | = | 27.5 *acid* | + | 59.1 *potash* |

*Pharmaceutical Calendar for the Climate of Weimar, by Goëtling, shewing the Principal Objects which the Apothecary has to attend to in each Month of the Year.*

JANUARY.—The concentration of vinegar by freezing,
Muriate of antimony,
Ethers, dulcified spirits,
Dippel's animal oil to be prepared;
Some gum-resins, as assafoetida, galbanum, ammoniac, &c. to be powdered.

FEBRUARY—As in January.

MARCH.—Mezereon bark,
Misleto of the oak to be gathered;
Conserve of scurvy-grass, to be prepared.

APRIL.—Spirit of scurvy-grass,
Syrup of violets to be prepared.

MAY.—Sloe flower water,
Conserve of sorrel;
Plaster of henbane,
Extract of succory, henbane, grass, dandelion, &c.
Oil of beetles (Meloë majalis et proscarabaeus),
Spirit of ants, earthworms, &c.

JUNE.—Distilled water of lily of the valley,
Various distilled spiritous waters,
Conserves of various herbs and flowers, as conserve of roses &c.
Hemlock plaster,
Extracts of hemlock, fumatory, wild lettuce, aconite, &c.

JULY.—Vinegar of roses,
Rose Water,
Marjoram butter,
Preserved cherries, walnuts. currants, &c.
Extract of elaterium,
Honey of roses,
Boiled oil of Hypericum, &c.
Distilled oil of rosemary, mint, parsley, pennyroyal, wild thyme, &c.
Syrup of cherries, raspberries, &c.
Spirit of rosemary.

AUGUST.—Cherry water,
Extract of blessed thistle, thorn apple, &c.
Boiled oil of wormwood, chamomile, &c.
Distilled oil of wormwood, chamomile, peppermint, millefoil, rue, &c.
Rob and syrup of mulberries.

SEPTEMBER.—Quince cinnamon water,
Oxymel of meadow saffron,
Quince cakes,
Syrup of barberries, quince, buckthorn,
Tincture of steel, with quince juice.

OCTOBER.—Tincture of steel with apple juice.

NOVEMBER and DECEMBER.—As in January.

# PART II.

# MATERIA MEDICA.

EVERY substance employed in the cure of disease, whether in its natural state, or after having undergone various preparations, belongs to the Materia Medica, in the extended acceptation of the words. But in most Pharmacopœias, the materia medica is confined to simples, and to those preparations which are seldom prepared by the apothecary himself, but commonly purchased by him, as articles of commerce, from druggists and others.

Systematic authors on this branch of medical knowledge have bestowed much pains in contriving scientific arrangements of these articles. Some have classed them according to their natural resemblances; others according to their active constituent principles; and others according to their real or supposed virtues. Each of these arrangements has its particular advantages. The first will probably be preferred by the natural historian, the second by the chemist, and the last by the physiologist. But every scientific classification hitherto proposed is liable to numerous objections. Accordingly, in the Pharmacopœias published by the colleges of physicians of London, Dublin, and Edinburgh, the articles of the materia medica are arranged in alphabetical order; and the same plan is now almost universally adopted. I have therefore also followed it, subjoining to the name of each article, admitted by any of the British colleges, a short view of its natural, medical, and pharmaceutical history; and in thus forming a Dictionary of Materia Medica, I have generally adopted the nomenclature of the Edinburgh college.

Acacia. Willd. *Lond. Ed.*
Mimosa. Linn. *Dub.*
*Polygamia Monoecia*, Linnaei Species Plantarum, edit. Willdenow, *g.* 1902.—Nat. ord. *Lomentaceæ.*

*Sp.* 87. Acacia vera. Willd. *Lond. Ed.*
Mimosa nilotica. Linn. *Dub.*

*Sp.* 86. Acacia Arabica. *Ed.*
Gum Mimosa.

*Officinal.*—The gum. Gum-Arabic.
Acaciæ arabicæ gummi. *Ed.*
Acaciæ gummi. *Lond.*
Gummi arabicum. *Dub.*

Gum Arabic is obtained from various species of Acacia, which grow in the sandy deserts of Africa, Arabia Petræa, and Egypt. The greatest quantity of pure gum is furnished by the species named by the Colleges. From these it exudes either spontaneously, or from incisions made into the bark, and afterwards hardens in the air. But a similar gum may be obtained from all the species of Acacia, and from many other trees, such as the Swietenia febrifuga, Melia azadirachta, and the different species of Terminalia. It is remarkable that the barks of all the trees which furnish this bland mucilaginous substance are highly astringent; that of the Acacia itself is used in India for tanning; and in our country, the cherry and plum trees, which sometimes yield a little gum, have very astringent barks.

There are two kinds of gum found in the shops, and often sold promiscuously, but distinguished in commerce by the names of Gum Arabic, and East-India gum. Gum Arabic consists of roundish transparent tears, colourless, or of a yellowish colour, shining fracture, without smell or taste, and perfectly soluble in water. The pieces which are most transparent, and have least colour, are reckoned the best. They are sometimes selected from the Gum Arabic in sorts, and sold for about double the price, under the title of Picked gum. The East India gum is darker coloured than Gum Arabic, and is not so readily soluble in water. I possess a mass of gum, gathered from an Acacia in New South Wales, by Mr Jamieson. It is darker coloured even than East-India gum, and is also less soluble than it; for when suspended in water, it gives off white films, which float through the mucilage. But its most remarkable property is, that it does not precipitate silicized potass; in which respect it agrees, as far as my experiments go, with gum collected in this neighbourhood from the common cherry and

plum trees. It is also remarkable, that the coarsest gum forms the thickest mucilage; at least Botany-Bay gum forms a thicker mucilage than East-India gum, and this than Gum Arabic.

Gum Arabic was originally brought from Arabia, by the way of Egypt, to Marseilles; and it was not until the beginning of the seventeenth century that the Dutch made the gum of Senegal known in Europe. After the French got possession of that river, they directed their attention to it, as an important object of commerce, and ascertained, by experiments made in the latter half of the seventeenth century, that gum Senegal was superior to the best gum of Arabia; and for about fifty years it has had the preference.

M. Adanson examined all the gum trees of West Africa with great care, and has given the best description of them. They amount to forty in number; but the three great forests which supply the Senegal market consist chiefly of two kinds; one which produces a white gum, called *Vereck*, and another, called *Nebueb*, which yields a red gum.

About the middle of November, that is, after the rainy season, which begins early in July, a gummy juice exudes spontaneously from the trunk and principal branches. In about fifteen days, it thickens in the furrow, down which it runs, either in a vermicular shape, or more commonly assuming the form of round or oval tears, about the size of a pigeon's egg, of different colours, as they belong to the white or red gum-tree. About the middle of December, the Moors encamp on the borders of the forest, and the harvest lasts six weeks. The gum is packed in very large sacks of tanned leather, and brought on camels and bullocks to certain ports, where it is sold to the French and English merchants. About 1787, the annual quantity purchased by the former was about 800,000 pounds, and by the latter 400,000, according to the information of M. Golberry.

Mr Jackson, in his account of the Empire of Morocco, informs us, that from Mogodor they export two sorts of gum, one the common Gum Arabic, the produce of Morocco, and called Barbary gum; the other finer, called Gum Soudan, or Senegal, brought from Timbuctoo by the caravans. He also says, but it must be observed that he is no botanist, that the gum called Morocco or Barbary gum is produced from a thorny tree called *Attaleh*, having leaves similar to the juniper, whereas all the acacias have pinnated leaves. It yields most gum during the hot and parching heat of July and August; and the hotter the weather, and the more sickly the tree ap-

pears, the more gum it yields. A wet winter and a mild summer are unfavourable to gum.

Gum is highly nutritious. During the whole time of the gum harvest, of the journey, and of the fair, the Moors of the desart live almost entirely upon it; and experience has proved that six ounces are sufficient for the support of a man during twenty-four hours.

*Medical use.*—It possesses the powers of a mucilaginous demulcent in a high degree. It is useful, 1st, in all cases where there seems a natural deficiency of mucus in the intestinal canal, and was therefore recommended by Degner, and Pringle, and others dissolved in milk, barley water, or almond emulsion, to remove the tenesmus and painful stools. Zimmermann gave it in clyster for the same purpose.

2. In cases of acrid poisons, or acrid substances in general, taken into the stomach, to envelop their particles, and mitigate their action. With the same view it is sometimes given along with acrid medicines.

3. In an irritable state of the respiratory passages, as catarrh, hoarseness, and cough. For this purpose it may be either used in substance as a troche, or in a strong solution as a linctus, and may be combined with a little opium.

4. In gonorrhœa and ardor urinæ, probably upon a false analogy.

5. In salivation after mercury, or in small pox.

6. In phthisis pulmonalis, both as supposed to check hæmorrhagy, and as a light nourishment.

Externally it is applied,

1. In powders, to bleeding vessels of a small size, as a styptic, operating by gluing them up.

2. In solution, injected into the urethra, in gonorrhœa.

A scruple or upwards may be given three or four times a day in substance, powder or solution, and it may be combined with syrups, infusions and decoctions in general, but it is decomposed by alcohol, and acetate of lead.

*Sp.* 73. Acacia catechu. Willd. *Lond. Ed.*
Mimosa catechu. Linn. *Dub.*

*Off.*—Catechu. The extract of the wood.
Acaciæ catechu extractum *ex ligno.* *Ed.*
Catechu extractum. *Lond.*
Catechu. *Dub.*

This tree is a native of Hindostan. In Bengal, the extract of catechu, which was formerly termed, with peculiar impropriety, Japan Earth, is principally prepared from the internal

coloured part of the wood, by decoction, evaporation, and exsiccation in the sun. But catechu is also prepared in India from several other species of Acacia, and even from the woods, barks, and fruits of other genera. In Mysore, it is chiefly prepared from the nuts of the Areca catechu. The nuts are taken as they come from the tree, and boiled for some hours in an iron vessel. They are then taken out, and the remaining water is inspissated by continued boiling. The process furnishes the Kassu, or the most astringent terra japonica, which is black, and mixed with paddy husks and other impurities. After the nuts are dried, they are put into a fresh quantity of water, boiled again; and this water being inspissated like the former, yields a kind of catechu, called Coury, which has little astringency, but is preferred by the betle eaters. It is yellowish-brown, has an earthy fracture, and is free from the admixture of foreign bodies.

The Bombay catechu is of a uniform texture, and of a red-brown tint, its specific gravity being generally about 1.39. The extract from Bengal is more friable and less consistent. Its colour is like that of chocolate externally; but when broken, its fracture presents streaks of chocolate and of red brown.—Its specific gravity is about 1.28. Their tastes are precisely similar, being astringent, but leaving in the mouth a sensation of sweetness. They do not deliquesce, or apparently change by exposure to the air, and are not fusible.

In the first edition of this Dispensatory, in 1803, I published, as the results of my analysis of catechu, that it consisted chiefly of tannin and extractive. This has been confirmed by the subsequent examination by Sir H. Davy, who states that it contains about one half of its weight of tannin, 35. *per cent.* of extractive, 6 to 8 of mucilage, and 5 to 7 of impurities. This more exact analysis confirms the observations made by me, in the first edition of this Dispensatory.

*Medical use.*—Catechu is one of the most convenient and powerful astringents we possess, and may be exhibited in every case where astringents are indicated. It is particularly serviceable in diarrhœa, in hoarseness from relaxation of the fauces, ulcers and aphthæ in the mouth, and in excoriations, with lymphatic exudations.

ACETUM; scientific synonime, *Acidum Aceticum impurum. Lond. Ed.*

ACETUM VINI. *Dub.*

Vinegar. Impure acetic acid.

VINEGAR, as obtained by the fermentation of vinous liquors,

besides the pure acetic acid diluted with much water, contains tartaric acid, tartrate of potass, mucilaginous and saccharine matters, a peculiar spiritous liquor described by Mr Chenevix, and sometimes malic and phosphoric acid. Mr Chenevix found that English vinegar of specific gravity 1.0042 contained more water and mucilage, but less acid and spiritous liquor than French vinegar of 1.00721. The best vinegar is that prepared from white wine. Vinegar should be of a pale yellow colour, perfectly transparent, of a pleasant, somewhat pungent, acid taste, but without any acrimony. From the mucilaginous impurities which vinegar always contains, it is apt, on exposure to the air, to become turbid and ropy, and at last vapid. This inconvenience is best obviated by keeping it in bottles completely filled and well corked; and it is said to be of advantage to boil it in the bottles a few minutes before they are corked.

Vinegar is sometimes adulterated with sulphuric acid. Its presence is detected, if, on the addition of a solution of nitrate of baryta, a white precipitate is formed, which is insoluble in nitric acid, after having been burnt in the fire. With the same intention, of making the vinegar appear stronger, different acrid vegetables are occasionally infused in it. This fraud is difficult of detection; but when tasted with attention, the pungency of such vinegar will be found to depend rather on acrimony than acidity.

Vinegar possesses strong antiseptic powers on dead animal and vegetable matters. Hence its employment in pickling. The fine green colour, so much admired in some vegetable pickles, is often improperly given by means of copper. This poisonous addition is easily detected, by the fine blue colour produced, on dropping some carbonate of ammonia into the suspected vinegar.

*Medical uses.*—Its action on the living body is gently stimulant and astringent. It promotes transpiration and the discharge by urine; and used moderately as a condiment, it facilitates digestion.

Vinegar is employed as a useful addition to drink in inflammatory fevers, in the proportion of about an ounce to a quart. Internally, it is used in ardent fevers and putrid diseases, in plague, in scurvy, and to counteract the effects of narcotic poisons and mephitic vapours. Faintings, hysterical and hypochondriacal complaints, and vomiting, are frequently relieved by vinegar taken into the stomach, or applied to the lips and nostrils. In the form of clyster, it is used in the same diseases, and in obstinate constipation. Externally, it is applied in fomentations and baths, as a stimulant and discutient;

and its vapour is inhaled in putrid sore throat, and diffused through the chambers of the sick, to correct the putrescency of the atmosphere.

Acidum citricum crystallizatum. *Ed.*
Acidum citricum crystallis concretum. *Dub.*
Citric acid crystallized.

The simple expressed juice of lemons is extremely apt to spoil, on account of the sugar, extractive, mucilage, and water, which cause it to ferment.

Various means have been proposed and practised, with the intention of rendering it less perishable and less bulky. The juice has been evaporated to the consistence of rob; but this always gives an empyreumatic taste, and does not separate the extractive or mucilage, so that it is still apt to ferment when agitated on board of ship in tropical climates. It has been exposed to frost, and part of the water removed under the form of ice; but this is liable to all the former objections, and besides, where lemons are produced in sufficient quantity, there is not a sufficient degree of cold. The addition of a quantity of alcohol to the inspissated juice separates the mucilage, but not the extractive or sugar. By means, however, of Scheele's process, as reduced to determinate quantities by Proust, we can obtain the acid perfectly pure and crystallized.

It is now manufactured in this country, in large quantities, and sold under the name of Coxwell's Concrete Salt of Lemons; and a formula is given for its preparation, by the London college.

Acidum sulphuricum. *Lond. Dub. Ed.*
Sulphuric acid, Vitriolic acid.

The London college directs, that in the shops its specific gravity should be to that of water as 1850 to 1000; the Dublin and Edinburgh colleges as 1845 to 1000. This want of uniformity is to be regretted.

The physical and chemical properties of this acid have been already enumerated. As it is prepared by the trading chemist, it is inserted among the materia medica. It is obtained in two ways; by distilling off the acid from sulphate of iron, previously deprived of its water of crystallization by heat, or by burning sulphur in large leaden chambers, with an eighth part of nitrate of potass to supply the necessary oxygen. In the first way the strongest acid is obtained, but it is apt to contain iron or copper. By the second process it generally contains lead, which is easily detected by mixing a portion of the acid

with three parts of distilled water, and if the acid be impure, a deposition will be formed. It may be rendered perfectly pure by distillation, filling a retort half full of the common acid, and distilling in a sand-bath, gradually heated as long as any acid comes over. The receiver should not be luted on.

Sulphuric acid acts powerfully on dead animal substances, becoming diluted with water formed by the union of part of their hydrogen and oxygen; another portion of the hydrogen combines with the azote to form ammonia, and the carbon is separated in the state of charcoal. The affinities which regulate this action are so powerful, that it produces the same effects on the living solid, and therefore it acts upon them as a corrosive. But to its employment with this view, its fluidity is an objection, as it cannot be easily managed.

*Medical uses.*—These will be explained when we treat of the diluted sulphuric acid. The concentrated acid, however, made into an ointment with sixteen times its weight of axunge, has been used in the cure of psora.

ACONITUM.

Willd. *g.* 1062. *Polyandria Trigynia.*—Nat. ord. *Multisiliquæ.*

*Species* 9. ACONITUM NEOMONTANUM. *Dub.*

*Sp.* 8. ACONITUM NAPELLUS. *Lond. Ed.*

Large blue Wolfsbane, Monk's-hood, Aconite.

*Officinal*—The leaves.

ACONITI FOLIA. *Lond. Dub.*

ACONITI NAPELLI FOLIA. *Ed.*

We are assured by Willdenow, that the *Neomontanum* is the species of aconite which has always been used in medicine; although it is almost universally known by the name of Aconitum Napellus, in consequence of a botanical error of Stoerk, who introduced it into practice.

It is a perennial plant, found in the Alpine forests of Carinthia, Carniola, and other mountainous countries in Germany, and cultivated in our gardens.

The fresh plant and root are very violent poisons, producing remarkable debility, paralysis of the limbs, convulsive motions of the face, bilious vomiting, and catharsis, vertigo, delirium, asphyxia, death. The fresh leaves have very little smell, but when chewed have an acrid taste, and excite lancinating pains, and swelling of the tongue. By drying, their acrimony is almost entirely destroyed. For medical use, the plant must be gathered before the stem shoots.

*Uses and dose.*—When properly administered, it acts as a

penetrating stimulus, and generally excites sweat, and sometimes an increased discharge of urine.

On many occasions it has been found a very effectual remedy in glandular swellings, venereal nodes, stiff joints, spina ventosa, itch, amaurosis, gouty and rheumatic pains, intermittent fevers, and convulsive disorders.

When the powder of the dried leaves is to be used, we may begin by giving one or two grains, and gradually increase the dose; but it is commonly used in the form of an inspissated juice. As soon as the plant is gathered, the juice is expressed, and evaporated, without any previous clarification, to the consistence of an extract. It is to be regretted, that the powers of this medicine vary very much, according to its age, and the heat employed in its preparation. When recently prepared, its action is often very violent; and when kept more than a year, it becomes totally inert. It may therefore be laid down as an universal rule, in the employment of this and of many other similar active medicines, to begin with very small doses, and to increase them gradually to the necessary degree; and whenever we have occasion to begin a new parcel of the medicine, we should again commence with the smallest dose, and proceed with the same caution as at first.

We may begin with giving half a grain of this extract, either formed into a powder with ten grains of white sugar, or made up with any convenient addition into a pill, twice or thrice a-day, and gradually increase the dose; or a tincture of aconite may be prepared, by digesting one part of the dried leaves in six parts of spirit of wine; the dose of which will be at first five or ten drops, and may be gradually increased to forty.

ACORUS CALAMUS. *Ed. Lond. Dub.*

Willd. *g.* 663. *sp.* 1.—Smith. *Flor. Brit. g.* 179. *sp.* 1.—*Hexandria Monogynia.*—Nat. Ord. *Piperitæ.*

Sweet flag.

*Officinal*—The root.

ACORI CALAMI RADIX. *Ed.*

CALAMI RADIX. *Lond.*

ACORI RADIX. *Dub.*

THIS plant is perennial, and grows plentifully in rivulets and marshy places about Norwich, and other parts of England, in the canals of Holland, in Switzerland, and in other countries of Europe. The shops have been usually supplied from the Levant with dried roots, which do not appear to be superior to those of our own growth.

The root is full of joints, crooked, somewhat flatted on the sides, internally of a white colour, and loose spongy texture; its smell is strong; the taste warm, acrid, bitterish, and aromatic; both the smell and taste are improved by exsiccation. It is generally looked upon as a carminative and stomachic medicine, and as such is sometimes made use of in practice. It is said by some, though erroneously, to be superior in aromatic flavour to any other vegetable that is produced in these northern climes. It is, nevertheless, a sufficiently elegant aromatic. The fresh root candied is said to be employed at Constantinople as a preservative against epidemic diseases. The leaves of this plant have a sweet fragrant smell, more agreeable, though weaker, than that of the roots.

From sixteen ounces of the dried root, Neumann obtained by distillation about two scruples of fragrant volatile oil. It also rose in distillation with water, but not with alcohol. The spiritous extract from two ounces weighed 370 grains, and water extracted from the residuum, 190 grains. The watery extract from two ounces weighed 455 grains, and the residuum gave out to alcohol 43. It contains a volatile oil, extractive, gum, resin and starch.

ADEPS OVILLUS. *Ed.*
SEVUM. *Lond. Dub.*
*Off.*—Mutton suet.

Mutton-suet is officinal, for the purpose of giving consistency to some ointments and plasters. It is the stiffest and least fusible of the officinal animal fats.

ADEPS SUILLUS. *Dub. Ed.*
ADEPS. *Lond.*
*Off.*—Hogs-lard.

HOGS-LARD is a very pure animal fat, of a soft consistence. Hence it is emollient, and is a convenient article for the formation of ointments, plasters, and liniments. It is also used without addition to discuss tumours by friction.

ÆSCULUS HIPPOCASTANUM. *Dub.*
Willd. *g.* 717. *sp.* 1.—*Heptandria Monogynia.*—Nat. Ord. *Trihilatæ.*
Horse chesnut.
*Officinal*—The bark.
ÆSCULI HIPPOCASTANI CORTEX. *Dub.*

THE bark is bitter, and has been proposed as an indigenous substitute for the very expensive and often adulterated Peru-

vian bark. Many successful experiments of its effects, when given internally in intermittent and continued fever, and also when applied externally in gangrene, sufficiently warrant future trials. Although chemical analysis is not yet sufficiently advanced, to enable us to determine from it the medical effects of any substance, I may observe, that the active constituent of this bark is tannin, which is scarcely compatible with the presence of cinchonin, the predominant, and probably the active, constituent of Peruvian bark. In powder, it may be given to the extent of a scruple and a half, or a drachm, for a dose. Buchholz prefers a solution of a drachm of the extract in an ounce of cinnamon water, of which sixty drops are to be given every three hours.

AGRIMONIA EUPATORIA. *Dub.*

Willd. *g.* 951. *sp.* 1.—Smith. *Flor.Brit.* *g.* 224, *sp.* 1.—*Dodecandria Digynia.*

Agrimony.

*Officinal*—The herb.

AGRIMONIÆ HERBA. *Dub.*

THE herb, when fresh, has a pleasant smell, which, however, it loses on being dried. Its taste is then bitterish and astringent. Lewis got from it an essential oil of a yellow colour.

ALCOHOL FORTIUS. *Ed.*

SPIRITUS VINOSUS RECTIFICATUS. *Dub.*

SPIRITUS RECTIFICATUS. *Lond.*

Alcohol, rectified spirit of wine.

The specific gravity should be, according to the London and Edinburgh colleges, to that of water as 835 to 1000. The Dublin college order it of the specific gravity 840.

Alcohol is the characteristic principle of vinous liquors. It arises from the decomposition of sugar by fermentation, and is found in greatest quantity in the wines of warm countries, prepared from thoroughly ripened fruit. In our home made wines, sugar is added to compensate for the want of it in our acescent fruits, and some of them, according to Brande's experiments, yield more alcohol than any foreign wine. It is the proportion of alcohol which renders wines more or less generous, and prevents them from becoming sour. The richer a wine is in alcohol, the less malic acid it contains; and therefore the best wines give the best brandy, because they are free from the disagreeable taste which the malic acid imparts to it. Old wines give better brandy than new wines, but less of it.

Alcohol is produced from vinous liquors by distillation; in conducting which, the following rules are to be observed:

1. To heat the whole mass of fluid at once, and equally.
2. To remove all obstacles to the ascent of the vapour.
3. To condense the vapour as quickly as possible.

The distillation is continued until the liquor which comes over is not inflammable.

Baumé mentions a very remarkable fact concerning the preparation of alcohol. He distilled two pounds of alcohol, specific gravity 832, in the water-bath, and filled the refrigeratory with ice, and he obtained two pounds four ounces of an alcohol having only specific gravity 862. This he ascribes to water condensed from the air in the worm by the coldness of the ice; and he assures us, from experience, that to get an alcohol of 827, it is absolutely necessary that the refrigeratory be filled with water of 145° F.

Distillers judge of the strength of spirits by the size and durability of the bubbles they form, when poured from one vessel into another, or on agitating them in a vessel partly filled. Another proof is, by the combustion of gunpowder; some of which is put in a spoon, and then covered with the spirit to be tried, which is set on fire; if the gunpowder be kindled, the spirit is supposed to be strong, and *vice versa.* But a small quantity of spirits will always kindle gunpowder, and a large quantity never. Another proof is by the carbonate of potass, which attracts the water, and dissolves in it, while the alcohol swims above, and the strength of the spirits is judged of by its quantity. But all these are uncertain; and dependence can only be put in the proof by hydrometers, or some other contrivance for ascertaining the weight of a given bulk at a given temperature.

In this country, alcohol is procured from an infusion of malt, and before its rectification is termed Whisky. In the East Indies, arrack, a spiritous liquor, is distilled from rice; in the West Indies, rum from the sugar-cane; and in France and Spain, brandy from wine. Of all these, the French brandy is the finest spirit; for the others are more or less impregnated with unpleasant essential oils, of which it is almost impossible to free them entirely.

The chemical properties of alcohol have been already mentioned.

*Medical uses.*—On the living body alcohol acts as a most violent stimulus. It coagulates all the albuminous and gelatinous fluids, and corrugates all the solids. Applied exter-

nally, it strengthens the vessels, and thus may restrain passive hæmorrhagies. It instantly contracts the extremities of the nerves it touches, and deprives them of sense and motion ; by this means easing them of pain, but at the same time destroying their use. Alcohol taken undiluted into the stomach, produces the same effects, contracting all the solid parts which it touches, and destroying, at least for a time, their use and office; if the quantity be considerable, a palsy or apoplexy follows, which ends in death. Taken in small quantity, and diluted, it acts as a cordial and tonic, raises the pulse, stimulates the stomach, and promotes digestion; if longer continued, the senses get disordered, voluntary motion is destroyed, and at length the most fatal consequences ensue. Vinous spirits, therefore, in small doses, and properly diluted, may be applied to useful purposes in the cure of diseases ; whilst in larger ones they produce deleterious effects. Its habitual use produces the most lamentable consequences,—dyspepsia, hypochondriasis, visceral obstructions, dropsy, tremours and paralysis.

ALCOHOL DILUTIUS. *Ed.*
SPIRITUS VINOSUS TENUIOR. *Dub.*
SPIRITUS TENUIOR. *Lond.*
Diluted Alcohol. Spirit of wine. Proof spirit.

STRONG ALCOHOL mixed with an equal quantity of water. Its specific gravity is to that of distilled water as 935 to 1000 *(Ed.)* The London and Dublin colleges order it of the specific gravity of 930, and the latter adds, " Almost all the spirit sold under the name of *Proof spirit*, is contaminated with empyreumatic oil and unfit for medical use. A spirit of nearly the same specific gravity is prepared by mixing four measures of rectified spirit with three measuers of distilled water, which should always be employed in the preparation of tinctures."

Diluted alcohol should always be prepared, by mixing rectified spirit with water; but it is hardly to be expected that apothecaries will either be at the trouble or expence of preparing it in this manner. Instead of it, an impure spirit of the requisite strength is commonly employed. The diluted alcohol of the Edinburgh college is somewhat weaker than that of the two other colleges; but besides that it is more convenient for their mode of preparing it, this will be attended with no disadvantage, as it is still sufficiently strong for any ordinary purpose.

Table *of various mixtures of Alcohol and Water, shewing their Specific Gravities according to Gilpin at 60° and 55°, and their degrees according to Baumé's hydrometer; and also in Clark's hydrometer, which is used by the Revenue.*

| Water. | Alcohol. | Sp. Gr. 60° | Sp. Gr. 55° | Baumé 55° | Sp. Gr. 60° | Clark's Hydrom. |
|---|---|---|---|---|---|---|
| 0 | 100 | .825 | .82736 | 38 | 833 | Spirit of wine. |
| 10 | 100 | .84568 | .84802 | 34+ | 858 | 1 to 2 |
| 20 | 100 | .86208 | .86441 | 30— | 881 | 1 to 3 |
| 30 | 100 | .87569 | .87796 | 29+ | 891 | 1 to 4 |
| 40 | 100 | .88720 | .88945 | 27+ | 896 | 1 to 5 |
| 50 | 100 | .89707 | .89933 | 25+ | 900 | 1 to 6 |
| 60 | 100 | .90549 | .90768 | 23— | 904 | 1 to 7 |
| 70 | 100 | .91287 | .91502 | 22 | 907 | 1 to 8 |
| 80 | 100 | .91933 | .92145 | 21— | 909 | 1 to 9 |
| 90 | 100 | .92499 | .92707 | 20— | 910 | 1 to 10 |
| 100 | 100 | .93002 | .93208 | 19— | 913 | 1 to 15 |
| 100 | 90 | .93493 | .93696 | 19+ | 916 | 1 to 20 |
| 100 | 80 | .94018 | .94213 | 18 | 920 | Proof spirit. |
| 100 | 70 | .94579 | .94767 | 17— | 926 | 1 in 20 |
| 100 | 60 | .95181 | .95357 | 16— | 928 | 1 in 15 |
| 100 | 50 | .95804 | .95966 | 16 | 932 | 1 in 10 |
| 100 | 40 | .96437 | .96575 | 15 | 933 | 1 in 9 |
| 100 | 30 | .97074 | .97181 | 14+ | 934 | 1 in 8 |
| 100 | 20 | .97771 | .97847 | 13 | 936 | 1 in 7 |
| 100 | 10 | .98654 | .98702 | 12 | 938 | 1 in 6 |
| 100 | 0 | 1. | | 10 | 942 | 1 in 5 |
| | | | | | 945 | 1 in 4 |
| | | | | | 954 | 1 in 3 |
| | | | | | 964 | 1 in 2 |

Allium.

Willd. g.626.—*Hexandria Monogynia.*—Nat. ord. *Liliaceæ.*

*Sp.* 14. Allium sativum. *Ed. Dub. Lond.*

Garlic.

*Officinal.*—The root.

Allii radix. *Lond. Dub.*

Allii sativi radix. *Ed.*

Garlic is a perennial bulbous-rooted plant, which grows wild in Sicily, and is cultivated in our gardens. The root consists of five or six small bulbs called *cloves*, inclosed in one common membranous coat, but easily separable from each other. All the parts of this plant, but more especially the root, have a strong offensive, very penetrating, and diffusible

smell, and an acrimonious, almost caustic taste. The root is full of a limpid juice, of which it furnishes almost a fourth part of its weight by expression.

By Neumann's analysis, it lost two-thirds of its weight by exsiccation, but scarcely any of its smell or taste. By decoction, from 960 parts water extracted 380, and the residuum yielded 27 to alcohol, and was reduced to 40. Alcohol applied first, extracted 123, the residuum yielded 162 to water, and was reduced to 40. In both cases the alcoholic extract was unctuous and tenacious, and precipitated metallic solutions. But the active ingredient is a yellowish thick ropy essential oil, according to Hagen heavier than water, of which the proportion is very small, but in which alone reside the smell, the taste, and all that distinguishes the garlic. By decoction the virtues of garlic are entirely destroyed; but its peculiar virtues are in some degree extracted by alcohol and acetous acid.

*Medical use.*—Applied externally, it acts successively as a stimulant, rubefacient, and blister. Internally, from its very powerful and diffusible stimulus, it is often useful in diseases of languid circulation and interrupted secretion. Hence, in cold leucophlegmatic habits, it proves a powerful expectorant, diuretic, and, if the patient be kept warm, sudorific; it has also been by some supposed to be emmenagogue. For the same reason, in cases in which a phlogistic diathesis, or irritability, prevails, large doses of it may be very hurtful.

It is sometimes used by the lower classes as a condiment, and also enters as an ingredient into many of the epicure's most favourite sauces. Taken in moderation, it promotes digestion; but in excess, it is apt to produce headach, flatulence, thirst, febrile heat, and inflammatory diseases, and sometimes occasions a discharge of blood from the haemorrhoidal vessels.

In fevers of the typhoid type, and even in the plague itself, its virtues have been much celebrated.

Garlic has been said to have sometimes succeeded in curing obstinate quartans, after cinchona had failed. In catarrhal disorders of the breast; asthma, both pituitous and spasmodic; flatulent colics, hysterical and other diseases, proceeding from laxity of the solids, it has generally good effects: it has likewise been found serviceable in some hydropic cases. Sydenham relates, that he has known the dropsy cured by the use of garlic alone; he recommends it chiefly as a warm strengthening medicine in the beginning of the disease.

It is much recommended by some as an anthelmintic, and has been frequently applied with success externally as a stimu-

lant to indolent tumours, in cases of deafness proceeding from atony or rheumatism, and in retention of urine, arising from debility of the bladder.

Garlic may either be exhibited in substance, and in this way several cloves may be taken at a time without inconvenience, or the cloves cut into slices may be swallowed without chewing. This is the common mode of exhibiting it for the cure of intermittents.

The expressed juice, when given internally, must be rendered as palatable as possible, by the addition of sugar and lemon juice. In deafness, cotton moistened with the juice is introduced within the ear, and the application renewed five or six times in one day.

Infusion in spirit, wine, vinegar, and water, although containing the whole of its virtues, are so acrimonious, as to be unfit for general use; and yet an infusion of an ounce of bruised garlic in a pound of milk was the mode in which Rosenstein exhibited it to children afflicted with worms.

But by far the most commodious form for administering garlic is that of a pill or bolus conjoined with some powder, corresponding with the intention of giving the garlic. In dropsy, calomel forms a most useful addition. It may also sometimes be exhibited with advantage in the form of a clyster.

Garlic made into an ointment with oils, &c. and applied externally, is said to resolve and discuss indolent tumours, and has been by some greatly esteemed in cutaneous diseases. It has likewise sometimes been employed as a repellent. When applied under the form of a poultice to the pubes, it has sometimes proved effectual in producing a discharge of urine, when retention has arisen from a want of due action in the bladder. Sydenham assures us, that among all the substances which occasion a derivation or revulsion from the head, none operates more powerfully than garlic applied to the soles of the feet: with this intention he used it in the confluent small-pox, about the eighth day, after the face began to swell; the root cut in pieces, and tied in a linen cloth, was applied to the soles, and renewed once a-day till all danger was over.

*Sp.* 43. Allium cepa. *Dub.*
Onion.
*Officinal.*—The root.
Cepæ radix. *Dub.*

This is also a perennial bulbous-rooted plant. The root is a simple bulb, formed of concentric circles. It possesses in

general the same properties as the garlic, but in a much weaker degree. Neumann extracted from 480 parts of the dry root, by means of alcohol, 360, and then by water 30; by water applied first 395, and then by alcohol 30; the first residuum weighed 56, and the second 64. By distillation the whole flavour of the onion passed over, but no oil could be obtained.—Wiegleb says, that all this class of vegetables as well as the acrid cruciform, owe their acrimony to a subtile essential oil, and that they contain combined ammonia, which can be obtained by distillation with a solution of potass. Vauquelin ascribes its acrimony to volatile oil combined with sulphur, and its sweetness to uncrystallizable sugar with mucus, gluten and animo-vegetable matter.

*Medical uses.*—Onions are considered rather as an article of food than of medicine: by their stimulating quality they tend to excite appetite, and promote the secretions; but when eaten liberally produce flatulence, occasion thirst, headach, and turbulent dreams. By some they are strongly recommended in suppression of urine, and in dropsies. The chief medicinal use of onions in the present practice is in external applications, as a cataplasm for suppurating tumours, &c.

*Sp.* 2. Allium porrum. *Lond.*
Leek.
*Off.*—The root.
Porri radix. *Lond.*

The common leek is rather an article of the Materia Alimentaria, than of the Materia Medica. It is milder even than the common onion. A decoction of the beards or filaments of the bulbs is supposed by the vulgar to be lithontriptic.

Aloe.
Willd. *g.* 659.—*Hexandria Monogynia.*—Nat. ord. *Liliaceæ.*

The London College now agree with that of Dublin, and with Thunberg, in indicating the *Aloë spicata* as the species which produces the Socotorine aloes; and they assume as the source of the Barbadoes aloes, a species to be described under the name of *Aloë vulgaris*, in the great work of the late Dr Sibthorpe, the Flora Graeca, now preparing for publication by Dr Smith, who informed Dr Powell, the authorised translator and commentator of the London Pharmacopœia, "that the plant described under the above name is asserted by Dr Sibthorpe to be the true *Aloë* of Dioscorides, which is described as producing our Officinal Barbadoes aloes by Sloane, in his history of Jamaica."

Sp. 2. Aloe vulgaris. *Lond.*
Sp. 5. Aloe sinuata? *Dub.*

*Off.*—The gum resin or extract, called Hepatic Aloes.
Aloe hepatica; Extractum. *Ed.*
Aloes vulgaris extractum. *Lond.*
Aloe hepatica; gummi-resina. *Dub.*

Hepatic aloes is of two kinds, one from the East Indies, the other from Barbadoes. The former has a light brown, or reddish yellow colour; a clean fracture, and possesses nearly the same medical properties as the socotorine. Barbadoes aloes is not so clear and bright as the foregoing sort; it is also of a darker colour, more compact texture, and for the most part drier, though not so brittle. Its smell is much stronger and more disagreeable; the taste intensely bitter and nauseous, with little or nothing of the aromatic flavour of the socotorine. The best hepatic aloes from Barbadoes is in large gourd shells, and an inferior sort, which is generally soft and clammy, is brought over in casks. In Barbadoes the plant is pulled up by the roots, and carefully cleaned from the earth and other impurities. It is then sliced into small hand-baskets and nets, which are put into large iron boilers with water, and boiled for ten minutes, when they are taken out, and fresh parcels supplied till the liquor is strong and black, which is then strained into a deep vat, narrow at bottom, where it is left to cool and to deposite its feculent parts. Next day the clear liquor is drawn off by a cock, and again committed to a large iron vessel. At first it is boiled briskly, but towards the end it is slowly evaporated, and requires constant stirring to prevent burning. When it becomes of the consistence of honey, it is poured into gourds or calabashes for sale, and hardens by age. Barbadoes aloes is extremely apt to induce haemorrhoids; but it is generally preferred, because it is very difficult to adulterate it without altering its appearance.

Sp. 2. Aloe spicata. *Dub. Lond.*

*Off.*—The gum resin or extract, called Socotorine Aloes.
Aloes spicatæ extractum. *Lond.*
Aloe socotorina; gummi-resina. *Dub.*
Aloe socotorina. *Ed.*

This kind of aloes, which is the most esteemed, is brought, wrapt in skins, from the island of Socotora in the Indian Ocean. It is dark coloured, of a glossy clear surface, and in some degree pellucid; in mass of a yellowish red colour, with a purple cast; fracture unequal; easily pulverizable; when reduced to powder, of a bright golden colour.

It is hard and friable in the winter, somewhat pliable in summer, and growing soft between the fingers. Its taste is bitter and disagreeable, though accompanied with some aromatic flavour; the smell is not very unpleasant, and somewhat resembles that of myrrh. It is said not to produce haemorrhoidal affections so readily as Barbadoes aloes.

It is prepared in July, by pulling off the leaves, from which the juice is expressed, and afterwards boiled and skimmed. It is then preserved in skins, and dried in August in the sun. According to others, the leaves are cut off close to the stem, and hung up. The juice, which drops from them without any expression, is afterwards dried in the sun.

During the first four years that the Cape of Good Hope was in possession of the British, more than 300,000 pounds, the produce of that settlement, were imported into England; and as this quantity was infinitely greater than could be required for the purposes of medicine, it is not improbable, that, as Mr Barrow states, its principal consumption was by the London porter brewers.

### Fetid, Caballine, or Horse Aloes.

This is easily distinguished from both the foregoing kinds by its strong rank smell; although, in other respects, it agrees pretty much with the hepatic, and is not unfrequently sold in its stead. Sometimes the caballine aloes is prepared so pure and bright, as not to be distinguishable by the eye even from the socotorine; but its offensive smell, of which it cannot be divested, readily betrays it. Its fracture also resembles that of common rosin, with which it is often adulterated, whereas the fracture of socotorine aloes is unequal and irregular.

According to Neumann's analysis, 1000 parts of aloes contain about 7.8 soluble in water only, or analogous to gum, 94. soluble in alcohol only, or resinous matter, and 895 soluble both in alcohol and in water or extractive. Tromsdorff makes them consist of 25 resin and 75 extractive, and Lagrange of 32 resin and 68 extractive. Dr Lewis also remarks, that decoctions of aloes let fall a precipitate, as they cool, probably from extractive being more soluble in boiling than in cold water. He also found the hepatic aloes to contain more resin and less extractive than the socotorine, and this less than the caballine. Also Lagrange found in hepatic aloes 52 extractive, 42 resin and 6 insoluble matter. Tromsdorff, on the contrary, got 81.25 extractive, 6.25 resin, and 12.50 albumen. Boulduc also found in socotorine aloes $\frac{1}{4}$, and in hepatic aloes $\frac{1}{3}$ of resin. The resins of all the sorts,

purified by alcohol, have little smell; that obtained from the socotorine has scarcely any perceptible taste; that of the hepatic, a slightly bitterish relish; and the resin of the caballine, a little more of the aloëtic flavour. The extractive obtained separately from any of the kinds, is less disagreeable than the crude aloes: the extractive of socotorine aloes has very little smell, and is in taste not unpleasant; that of the hepatic has a somewhat stronger smell, but is rather more agreeable in taste than the extract of the socotorine: the extractive of the caballine retains a considerable share of the peculiar rank smell of this sort of aloes, but its taste is not much more unpleasant than that of the extractive obtained from the two other sorts. Fabbroni discovered that the juice expressed from the thick leaves acquired a beautiful purple colour in the air, and furnished a permanent dye.

*Medical use.*—Aloes is a bitter stimulating purgative, exerting its action chiefly on the rectum. In doses of from 5 to 15 grains it empties the large intestines, without making the stools thin; and likewise warms the habit, quickens the circulation, and promotes the uterine and hæmorrhoidal fluxes. If given in so large a dose as to purge effectually, it often occasions an irritation about the anus, and sometimes a discharge of blood.

It is frequently employed in cases of suppression of the menses, or of the hæmorrhoidal discharge; but it is particularly serviceable in habitual costiveness, to persons of a phlegmatic temperament and sedentary life, and where the stomach is oppressed and weakened. For its use in typhus fever, scarlatina, cynanche maligna, marasmus, chlorosis, haematemesis, chorea, hysteria, and tetanus, Dr Hamilton's excellent work on Purgatives may be consulted. Aloes is also used as an anthelmintic, both given internally and applied to the abdomen in the form of a plaster. Dissolved in alkohol, it is employed to check hæmorrhagies in recent wounds, and as a detergent in ulcers.

Some are of opinion, that the purgative virtue of aloes resides entirely in its resin; but experience has shewn, that the pure resin has little or no purgative quality, and that the extractive part separated from the resinous, acts more powerfully than the crude aloes. If the aloes indeed be made to undergo long coction in the preparation of the gummy extract, its cathartic power will be considerably lessened, not from the separation of the resin, but from an alteration made in the extractive itself by the action of the heat and air. The strongest vegetable cathartics become mild by a similar treatment.

Socotorine aloes, as already observed, contains more extractive than the hepatic; and hence is likewise found to purge more, and with greater irritation. The first sort, therefore, is most proper where a stimulus is required, as for promoting or exciting the menstrual flux; whilst the latter is better calculated to act as a common purge.

Aloes is administered either

*a.* Simply, or

*b.* In composition:

1. With purgatives. Soap, scammony, colocynth, rhubarb.
2. With aromatics. Canella.
3. With bitters. Gentian.
4. With emmenagogues. Iron, myrrh.

It is exhibited in the form of

*a.* Powder; too nauseous for general use.

*b.* Pill; the most convenient form.

*c.* Solution in wine or diluted alcohol.

ALTHÆA OFFICINALIS. *Ed. Lond.*

Willd. *g.* 1289, *sp.* 1.—*Smith's Flor. Brit. g.* 316, *sp.* 1.—*Monadelphia Polyandria.* —Nat. ord. *Columnaceæ.*

Marsh-mallow.

*Off.*—The root and leaves.

*a*) ALTHÆÆ OFFICINALIS RADIX. *Ed.*
ALTHÆÆ RADIX. *Lond.*

*b*) ALTHÆÆ OFFICINALIS FOLIUM. *Ed.*
ALTHÆÆ FOLIA. *Lond.*

The marsh-mallow is a perennial indigenous plant, which is found commonly on the banks of rivers, and in salt marshes. The whole plant, but especially the root, abounds with mucilage. The roots are about the thickness of a finger, long and fibrous. When peeled and dried, they are perfectly white.

From 960 parts of the dried root, Neumann extracted by water 650, and afterwards with alcohol 41; by alcohol applied first 360, and afterwards by water 348. Lewis extracted by alcohol only 120, and he observed that the alcoholic extract was sweeter than the watery, and had the smell peculiar to the root. The substance soluble in this instance, both in alcohol and water, is probably saccharine. From 960 parts of the dry leaves Neumann extracted by water 340, and then by alcohol 213: by alcohol first 280, and then by water 218. The residuum of the root was only one-fourth; that of the leaves one-half of the whole. The root is therefore the most mucilagi-

nous. I found that the decoction of the root reddens turnsole, and gelatinizes silicized potass.

*Med. use.*—It is used as an emollient and demulcent, in diseases attended with irritation and pain, as in various pulmonary complaints, and in affections of the alimentary canal and urinary organs; and it is applied externally in emollient fomentations, gargles, and clysters.

ALUMEN. Sulphas aluminæ et potassæ. *Ed.*
ALUMEN, s. s. Supersulphas aluminæ et potassæ. *Lond.*
ALUMEN, s. s. Supersulphas argillæ alcalisatæ. *Dub.*
Super-sulphate of alumina and potass. Alum.
Sulphate of alumina and potass.

ALUM is obtained principally from schistose clays, which contain iron pyrites, by roasting, exposure to the air, lixiviation, the addition of a proportion of potass ley, evaporation, and crystallization.

The roasting destroys the bituminous matters these clays commonly contain ; the exposure to the air acidifies the sulphur of the pyrites; and the addition of alkali is absolutely necessary for the constitution of alum, which is a triple, or even quadruple salt with excess of acid, consisting of sulphuric acid and alumina, with potass or ammonia, or both of them. The properties of alum do not seem to be affected by the nature of the alkali.

Near Whitby there are considerable works where alum is made, by burning a sulphuret of alumina, which is found there in the form of a soft grey clay, lying under a stratum of sand-stone, and by adding muriate of potass to the ley of sulphate of alumina thus obtained.

Alum crystallizes in regular octohedrons, whose sides are equilateral triangles. It has a sweetish but very astringent taste. It is soluble in 15 times its weight of water at 60°, and in three-fourths of its weight at 212°. It reddens vegetable blues. It effloresces slightly in the air. By the action of heat it first undergoes the watery fusion, then loses its water of crystallization, and lastly great part of its acid. It is decomposed by baryta, potass, soda, strontia, and all salts of which these are the bases; by the nitrate, muriate, phosphate, carbonate, borate, and fluate of ammonia; by the nitrate, muriate, phosphate, and carbonate of magnesia; and by the nitrate, muriate, and carbonate of lime. It is also decomposed by the gallic acid, by colouring matters, and by many animal and vegetable substances.

It commonly consists, according to Berzelius, of 37 sulphate of alumina, 18 sulphate of potass, and 45 of water.

*Medical use.*—Alum is a powerful astringent; it is reckoned particularly serviceable for restraining hæmorrhagies and immoderate secretions; but less proper in intestinal fluxes. In violent hæmorrhagies, it may be given in doses of fifteen or twenty grains, repeated every hour or half hour till the bleeding abates; in other cases, smaller doses are more advisable: large ones being apt to nauseate the stomach, and occasion violent constipations of the bowels. It is used also externally, in astringent and repellent lotions and collyria. Burnt alum, taken internally, has been highly extolled in cases of colic. In such instances, when taken to the extent of a scruple for a dose, it has been said gently to move the belly, and give very great relief from the severe pain.

AMMONIACUM. *Gummi resina. Lond. Dub. Ed.*
Ammoniac, a gum-resin.

AMMONIACUM is a concrete, gummy-resinous juice, brought from the East Indies, usually in large masses, composed of little lumps or tears, of a milky colour, but soon changing, upon being exposed to the air, to a yellowish hue.

Gum ammoniac is now referred by the London and Edinburgh Colleges, on the authority of Willdenow, to the *Heracleum gummiferum*, which he raised from seeds taken out of the Ammoniacum of the shops; and which, he is satisfied, is the plant which yields it, although he has not been able to procure it from the plants raised at Berlin. I regret that I have not been able to see the *Flora Berolinensis*, in which this plant is depicted, as the question might be decided, with great certainty, by comparing it with the figure, unfortunately not the drawing of a botanist, though sufficiently characteristic, published in his account of the empire of Morocco, by Mr Jackson, who was perfectly familiar with it. He gives the following account of it: " *Ammoniacum*, called *Feshook* in Arabic, is produced from a plant similar to the European fennel, but much larger. In most of the plains of the interior, and particularly about El Araiche and M'sharrah Rummillah, it grows ten feet high. The Gum ammoniac is procured by incisions in the branches, which, when pricked, emit a lacteous glutinous juice, which being hardened by the heat of the sun, falls on the ground, and mixes with the red earth below; hence the reason that Gum ammoniac of Barbary does not suit the London market. It might, however, with a little trouble, be procured perfectly pure; but when a prejudice is once established against any particular article, it is difficult to efface it. The gum, in the above-mentioned state, is used in all parts of the country, for

cataplasms and fumigations. The sandy light soil which produces the gum ammoniac, abounds in the north of Morocco. It is remarkable that neither bird nor beast is seen where this plant grows, the vulture only excepted. It is, however, attacked by a beetle, having a long horn proceeding from its nose, with which it perforates the plant, and makes the incisions whence the gum oozes out."

Ammoniacum has a nauseous sweet taste, followed by a bitter one; and a peculiar smell, somewhat like that of galbanum, but more grateful: it softens in the mouth, and acquires a white colour upon being chewed. It softens by heat, but is not fusible; when thrown upon live coals, it burns away in flame: it is in some degree soluble in water and in vinegar, with which it assumes the appearance of milk; but the resinous part, amounting to about one-half, subsides on standing.

Neumann extracted from 480 parts, 360 by alcohol, and then by water 105; by water applied first 410, and then by alcohol 60. Alcohol distilled from it arose unchanged, but water acquired a sweetish taste, and the smell of the ammoniac. More modern chemists say that the spirit drawn from it by distillation smelt strongly of the gum, and that a small portion of a very pungent strong smelling oil could be got from it. The solution in alcohol is transparent; but on the addition of water, becomes milky. It therefore seems to consist principally of a substance soluble both in water and in alcohol, combined with some volatile matter. Braconnot makes it consist of 700 resin, 184 gum, 44 gluten, and 60 water.

Such tears as are large, dry, free from small stones, seeds, or other impurities, should be picked out and preferred for internal use; the coarser kind is purified by solution, colature, and careful inspissation; but unless this be artfully managed, the gum will lose a considerable deal of its more volatile parts. There is often vended in the shops, under the name of strained gum ammoniacum, a composition of ingredients much inferior in virtue.

*Medical use.*—The general action of gum-ammoniac is stimulant. On many occasions, in doses of from ten to thirty grains, it proves a valuable antispasmodic, deobstruent, or expectorant. In large doses it purges gently, excites perspiration, and increases the flow of urine. It is used with advantage to promote expectoration in some pulmonary diseases, especially asthma and chronic catarrh; in dropsical affections, to augment the flow of urine, and to support the salivation in small pox. It is also an useful deobstruent; and is frequent-

ly prescribed for removing obstructions of the abdominal viscera, and in hysterical disorders, occasioned by a deficiency of the menstrual evacuation. In long and obstinate colics, proceeding from viscid matter lodged in the intestines, this gummy resin has produced good effects, after purges and the common carminatives had been used in vain. Externally, it is supposed to soften and ripen hard tumours, is often applied as a discutient in white swellings of the knee and other indolent tumours. A solution of it in vinegar has been recommended by some for resolving even schirrous swellings.

It is exhibited internally,

*a.* In solution, combined with vinegar, vinegar of squills, assa fœtida, &c.

*b.* In pills, with bitter extracts, myrrh, assa fœtida.

*c.* And externally, combined with turpentine, common plaster, &c.

AMOMUM.

Willd. *g.* 4.—*Monandria Monogynia.*—Nat ord. *Scitamineæ.* *Sp.* 1. AMOMUM ZINGIBER. Willd. *Ed. Dub.*

ZINGIBER OFFICINALE. Roscoe. *Lond.*

Ginger.

*Off. a*)—The dried root, the ginger of the shops.

AMOMI ZINGIBERIS RADIX. *Ed.*

ZINGIBERIS RADIX. *Lond.*

*b*) Preserved ginger imported from the East or West Indies.

ZINGIBERIS RADIX CONDITA. *Dub.*

IN the botanical arrangement of the well-known plant which produces the Ginger, the London College have followed Mr Roscoe of Liverpool, who has given a new classification of the Scitamineous plants in the eighth volume of the Linnæan Society, in which he has separated the Zingiber from the Cardamom. "It has been well remarked by Jussieu," says Mr Roscoe, "that the *Zingibers* flower in a dense spike near to the stem; the *Cardamoms* in a lax panicle at the base of the stem. Such an uniform natural distinction in the habit of these plants, gave great reason to suppose that, by a closer examination, sufficient generic distinctions would be ascertained. This expectation has been fully confirmed. In the plants of the Ginger tribe, it appears that the anthera-bearing filament is extended beyond the anthera, and terminates in an awl-shaped appendage, with a groove or furrow to receive the

style after it has passed between the lobes of the anthera, and which terminates with the stigma, a little beyond the extremity of the filament; but in the plants of the Cardamom, or proper amomum tribe, the anthera-bearing filament terminates in an appendage of three or more lobes, and differs also in other respects, as will be more particularly noticed under the genus *Amomum.*

Ginger is a perennial plant, indigenous in the East Indies, but now cultivated in the West India islands. It is cultivated there very much in the same manner as potatoes are here, and is fit for digging once a-year, unless for preserving in syrup, when it should be dug at the end of three or four months, at which time it is tender and full of sap.

Ginger is distinguished into two sorts, the black and the white. The former is rendered fit for preservation by means of boiling water, the latter by insolation; and as it is necessary to select the fairest and roundest sorts for exposure to the sun, white ginger is commonly one-third dearer than black.

Black ginger consists of thick and knotty roots, internally of an orange or brownish colour, externally of a yellow-grey. White ginger is less thick and knotty, internally of a reddish-yellow, and externally of a whitish-grey or yellow. It is firm and resinous, and more pungent than the black. Pieces which are worm-eaten, light, friable, or soft, and very fibrous, are to be rejected.

Preserved ginger should be prepared in India from the young and succulent roots. When genuine, it is almost transparent. That manufactured in Europe is opaque and fibrous.

Ginger has a fragrant smell, and a hot, biting, aromatic taste. Neumann obtained by distillation with water from 7680 parts of white ginger, about 60 of a volatile oil, having the smell and distinguishing flavour of the ginger, but none of its pungency. The watery extract was considerably pungent, and amounted to 2720, after which alcohol extracted 192 of a very pungent resin. Alcohol applied first extracted 660 of pungent resin, and water afterwards 2160 of a mucilaginous extract, with little taste, and difficultly exsiccated. The black ginger contained less soluble matter than the white.

*Medical use.*—Ginger is a very useful spice in cold flatulent colics, and in laxity and debility of the intestines; it does not heat so much as the peppers, but its effects are more durable. It may also be applied externally as a rubefacient. Lately, the powder of ginger, taken in very large doses in milk, was supposed to be almost specific in the gout.

*Sp.* 3. AMOMUM ZEDOARIA. *Dub.*
Long Zedoary.
*Off.*—The root.
ZEDOARIÆ RADIX. *Dub.*

THE zedoary is perennial, and grows in Ceylon and Malabar. The roots come to us in pieces, some inches in length, and about a finger thick. Externally they are wrinkled, and of an ash-grey colour, but internally they are brownish-red. The best kind comes from Ceylon, and should be firm, heavy, of a dark colour within, and neither worm-eaten nor very fibrous. It has an agreeably fragrant smell, and a warm, bitterish, aromatic taste.

In distillation with water, it yields a volatile oil, heavier than water, possessing the smell and flavour of the zedoary in an eminent degree; the remaining decoction is almost simply bitter. Spirit likewise brings over some small share of its flavour: nevertheless, the spiritous extract is considerably more grateful than the zedoary itself. From 7680 parts Neumann got 2720 of watery extract, and afterwards 140 of almost insipid resin; by applying alcohol first, 720, and water afterwards, 2400, much bitterer than the primary watery extract.

*Sp.* 7. AMOMUM CARDAMOMUM. *Dub.*
*Sp.* 10. ——— REPENS. *Ed.*
ELETTARIA CARDAMOMUM. *Lond.*
Lesser Cardamom.

*Off.*—Lesser cardamom seeds.
AMOMI REPENTIS SEMEN. *Ed.*
CARDAMOMI SEMINA. *Lond.*
CARDAMOMI MINORIS SEMINA. *Dub.*

BOTH of the species of Amomum are natives of India. The Edinburgh College, on the authority of Sonnerat, has supposed these seeds to be the product of the *repens*, while the Dublin College, with Murray, Willdenow, and all the foreign pharmaceutical writers, ascribe them to the *cardamomum*; and to increase the confusion, the London College have referred this last to a new genus. The reason of their doing so is thus stated by Dr Powell: " From an accurate description of the plant producing this valuable aromatic (Lesser Cardamoms) communicated to the Linnæan Society by Mr White, surgeon, Madras, (who, following the example of other botanical writers, improperly refers it to the genus *Amomum*,) it has been thought necessary to place the Cardamom under a new genus, which Dr Maton has named *Elettaria*, from the appellation

of *Ellettari*, originally given to this tribe by Van Reede, in his *Hortus Malabaricus.*"

Cardamom seeds are a very warm, grateful, pungent aromatic, and frequently employed as such in practice: they are said to have this advantage, that, notwithstanding their pungency, they do not, like the peppers, immoderately heat or inflame the bowels. Both water and rectified spirit extract their virtues by infusion, and elevate them in distillation; with this difference, that the tincture and distilled spirit are considerably more grateful than the infusion and distilled water: the watery infusion appears turbid and mucilaginous, the tincture limpid and transparent. From 480 parts Neumann got about 20 of volatile oil, 15 of resinous, and 45 of watery extract. The husks of the seeds, which have very little smell or taste, may be commodiously separated, by committing the whole to the mortar, when the seeds will readily pulverize, so as to be freed from the husk by the sieve: this should not be done till just before using them; for if kept without the husks, they soon lose considerably of their flavour.

AMYGDALUS COMMUNIS. *Ed. Dub. var. β and γ Lond.*

Willd. g. 981. *sp.* 2. *Icosandria Monogynia.*—Nat. ord. *Pomaceæ.*

The almond tree.

*Off. a*)—The kernel; sweet almonds.

AMYGDALI COMMUNIS NUCLEI. Amygdalæ dulces ex varietate sativa. *Ed.*

AMYGDALÆ DULCES. *Dub. Lond. var. β.*

*b*) The kernel; bitter almonds.

AMYGDALÆ AMARÆ. *Lond. var. γ.*

THE almond tree nearly resembles the peach. It originally came from Syria and Barbary, but is now much cultivated in the south of Europe. There is no apparent difference between the trees which produce the sweet and bitter almonds, and very little betwixt the kernels themselves; and it is said, without probability, that the same tree has, by a difference in culture, afforded both.

The almond is a flattish kernel, of a white colour, and of a bland sweet taste, or a strong bitter one. The skins of both sorts are thin, brownish, unpleasant, and covered with an arid powdery substance. They are very apt to become rancid on keeping, and to be preyed on by insects, which eat out the internal part, leaving the almond to appearance entire. To these circumstances regard ought to be had in the choice of them.

Sweet almonds are of greater use in food than as medicine, but they are reckoned to afford little nourishment; and when eaten in substance, are not easy of digestion, unless thoroughly comminuted. They are supposed, on account of their unctuous quality, to obtund acrimonious juices in the primæ viæ: peeled sweet almonds, eaten six or eight at a time, sometimes give present relief in the heartburn.

Bitter almonds have been found poisonous to dogs and smaller animals; and a water distilled from them, when made of a certain degree of strength, has had the same effects. The essential oil obtained by distillation is one of the most virulent poisons known. Nevertheless bitter almonds are every day used in cookery, on account of their agreeable flavour; but there are some habits, in which the smallest quantity produces urticaria, and other unpleasant symptoms. The similarity of the smell induced Mr Schrader to suppose that bitter almonds contained prussic acid, and he found, that this acid exists, but in a particular state, in all the bitter poisonous vegetable substances having the flavour of bitter almonds, and that in its pure state it is eminently poisonous.

Both sorts of almonds yield, on expression, a large quantity, between a third and fourth of fixed oil. It also separates upon boiling the almonds in water, and is gradually collected on the surface.

The oils obtained by expression from both sorts of almonds are in their sensible qualities the same. They should be perfectly free from smell and taste, and possess the other properties of fixed oils.

*Medical use.*—These oils are also supposed to blunt acrimonious humours, and to soften and relax the solids: hence their use internally, in tickling coughs, heat of urine, pains and inflammations; and externally, in tension and rigidity of particular parts. On triturating almonds with water, the oil and water unite together, by the mediation of the amylaceous matter of the kernel, and form a bland milky liquor, called an emulsion, which may be given freely in acute or inflammatory disorders. As the bitter almond imparts its peculiar taste when treated in this way, the sweet almonds alone are employed in making emulsions.

Several unctuous and resinous substances, of themselves not miscible with water, may, by trituration with almonds, be easily mixed with it into the form of an emulsion; and are thus excellently fitted for medicinal use. In this form camphor, and the resinous purgatives, may be commodiously taken.

AMYLUM. *See* TRITICUM.

AMYRIS.
Willd. *g.* 755. *Octandria Monogynia.*—Nat. ord. *Dumosæ.*
*Sp.* 2. AMYRIS ELEMIFERA. *Lond. Dub.*
Elemi.

*Off.*—The resin called Elemi.
ELEMI. Resina. *Lond. Dub.*

THE tree which furnishes elemi grows in Carolina and Spanish America. In dry weather, and especially at full moon, incisions are made in the bark, from which a resinous juice flows, and is left to harden in the sun. It is brought to us in long roundish cakes, generally wrapped up in flag leaves. The best sort is softish, somewhat transparent, of a pale whitish yellow colour, inclining a little to green, of a strong, not unpleasant smell, resembling somewhat that of fennel. Dr Wright says, that on wounding the bursera gummifera, a thick milky liquor flows, which soon concretes into a resin exactly resembling the elemi of the shops. Of one hundred parts ninety-four dissolve in alcohol, and part of its fragrance rises along with this menstruum in distillation: distilled with water it yields 6.4 of pale-coloured, thin, fragrant, essential oil: its only constituents, therefore, are resin and essential oil. It gives name to one of the officinal unguents, and is at present scarcely used in any other way.

*Sp.* 18. AMYRIS ZEYLANDICA.

THE elemi which comes from the East Indies is said to be the produce of this species.

*Sp.* 6. AMYRIS GILEADENSIS.

*Off.*—Balsam of Gilead. A liquid resin.

AMYRIDIS GILEADENSIS RESINA. *Edin.*

THIS substance, which has also had the name of Balsamum Judaicum, Syriacum, de Mecca, Opobalsamum, &c. is a resinous juice, obtained from an evergreen tree, growing spontaneously, particularly on the Asiatic side of the Red Sea, near Mecca. The true opobalsamum, according to Alpinus, is at first turbid and white, of a very strong pungent smell, like that of turpentine, but much sweeter; and of a bitter, acrid, astringent taste: upon being kept for some time, it becomes thin, limpid, of a greenish hue, then of a golden yellow, and at length of the colour of honey.

This balsam is in high esteem among the eastern nations, both as a medicine, and as an odoriferous unguent and cosmetic. But in Europe it is never obtained genuine; and as all

the signs of its goodness are fallacious, it has been very rarely employed. Nor need we regret it; for any of the other resinous fluids, such as the balsam of Canada or Copaiba, will answer every purpose full as well.

The dried berries of this tree were formerly kept under the title of Carpo-balsamum, aud the dried twigs under that of Xylo-balsamum. Although Willdenow has inserted the amyris opobalsamum as a distinct species, he thinks they are the same.

ANCHUSA TINCTORIA. *Ed. Dub.*

Willd. *g.* 277. *sp.* 7. *Pentandria Monogynia.*—Nat. ord. *Asperifoliæ.*

Alkanet, or false alkanet.

*Off.*—The root.

ANCHUSÆ TINCTORIÆ RADIX. *Ed.*

ANCHUSÆ RADIX. *Dub.*

THIS plant is a native of Europe : it is sometimes cultivated in our gardens; but the greatest quantities are raised in France and Germany, particularly about Montpelier and Silesia, from whence the dried roots are usually imported to us. The alkanet root produced in England is much inferior in colour to that brought from abroad ; the English being only lightly reddish, the others of a deep purplish red ; and it has been suspected, but without sufficient foundation, that the foreign roots owe part of their colour to art. The cortical part of the root is of a dusky red, and imparts an elegant deep red to alcohol, oils, wax, and all unctuous substances, but not to watery liquors.

Alkanet root has little or no smell ; when recent, it has a bitterish astringent taste, but when dried scarcely any. Its chief use is for colouring oils, ointments and plasters. As the colour is confined to the cortical part, the small roots are best, having proportionally more bark than the large.

Alkanet root has been analyzed by Mr John of Berlin. The colouring power resides in a peculiar substance, soluble in alcohol, ether and oils, and not soluble in water ; distinguished from the resins by not being fusible, and not being precipitated by water from its solution in alcohol. The tincture by evaporation changes from carmine red to blue, and then to greenish, and the dry extract has an indigo blue colour. Acids heighten the red colour of the tincture, and alkalies change it to blue, which is restored to the original colour by acids. The bark yields only about 5.50 *per cent.* of this substance, which John calls *Pseudo-alcannin*, to distinguish it from the unexamined colouring matter of the real alkanet,

which is furnished by the Lawsonia inermis, a native of India, Syria and Egypt.

ANETHUM.

Willd. *g.* 560. Smith, *g.* 151. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Willd. *sp.* 1. ANETHUM GRAVEOLENS. *Lond.*

Dill.

*Off.*—The seed.

ANETHI SEMINA. *Lond.*

DILL is an annual umbelliferous plant, cultivated in gardens, as well for culinary as medical use. The seeds are of a pale yellowish colour, in shape nearly oval, convex on one side, and flat on the other. Their taste is moderately warm and pungent; their smell aromatic, but not of the most agreeable kind. The seeds are recommended as a carminative in flatulent colics.

Willd. *sp.* 3. Smith, *sp.* 1. ANETHUM FŒNICULUM. *Ed. Lond. Dub.*

Sweet Fennel.

*Off.*—The root.

*a*) ANETHI FŒNICULI SEMINA. *Ed.*
FŒNICULI DULCIS SEMINA. *Dub.*
FŒNICULI SEMINA. *Lond.*

THIS is a biennial plant, of which there are four varieties. One of these, the common fennel, is indigenous on chalky cliffs. The sweet fennel, the variety which is officinal, grows wild in Italy, but is also cultivated in our gardens. It is smaller in all its parts than the common, except the seeds, which are considerably larger. The seeds of the two sorts differ likewise in shape and colour. Those of the common are roundish, oblong, flattish on one side, and protuberant on the other, of a dark almost blackish colour; those of the sweet are longer, narrower, not so flat, generally crooked, and of a whitish or pale yellowish colour.

The seeds of both the fennels have an aromatic smell, and a moderately warm pungent taste: those of the *fœniculum dulce* are in flavour most agreeable, and have also a considerable degree of sweetness.

From 960 parts, Neumann obtained 20 of volatile oil, 260 watery extract, and afterwards some alcoholic extract, which could not be exsiccated, on account of its oiliness. By applying alcohol first he got 84 resinous extract, 120 fixed oil, and then by water 129 of a bitter extract.

ANGELICA ARCHANGELICA. *Ed.*

Willd. *g.* 543, *sp.* 1.—Smith, *g.* 138. *sp.* 1.—*Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Angelica.

*Off.*—The root.

RADIX ANGELICÆ ARCHANGELICÆ. *Ed.*

ANGELICA is a large biennial umbelliferous plant. It grows spontaneously on the banks of rivers in alpine countries. It has been found wild in England, but it is doubtful whether it be indigenous. For the use of the shops, it is cultivated in gardens.

All the parts of angelica, especially the roots, have a fragrant aromatic smell, and a pleasant bitterish warm taste, glowing upon the lips and palate for a long time after they have been chewed. The flavour of the seeds and leaves is very perishable, particularly that of the latter, which, on being barely dried, lose the greatest part of their taste and smell: the roots are more tenacious of their flavour, though they gradually lose part of it. The fresh root, wounded early in the spring, yields an odorous yellow juice, which slowly exsiccated, proves an elegant gum-resin, very rich in the virtues of the angelica. On drying the root, this juice concretes into distinct moleculæ, which, on cutting it longitudinally, appear distributed in little veins : in this state, they are extracted by alcohol, but not by watery liquors. Angelica roots are apt to grow mouldy, and to be preyed on by insects, unless thoroughly dried, kept in a dry place, and frequently aired. Baumé says, that it is only the roots gathered in the spring that are subject to this inconvenience, and that when gathered in the autumn, they keep good several years. Roots only worm-eaten are as fit as ever for making a tincture, or affording volatile oil.

John analyzed the dried angelica root, and proved that it owed its peculiar properties to a considerable proportion of essential oil, and acrid resin ; but it also contained much gum and some inulin.

Angelica is one of the most elegant aromatics of European growth, though little regarded in the present practice. The root, which is the most efficacious part, is used in the aromatic tincture. The stalks make an agreeable sweetmeat, which is frequently presented in deserts to promote digestion.

ANTHEMIS.

Willd. *g.* 1517. Smith, *g.* 376. *Syngenesia Polygamia Superflua.*—Nat. ord. *Compositæ Radiatæ.*

Willd. *sp.* 15. Smith. *sp.* 1. ANTHEMIS NOBILIS. *Ed. Lond. Dub.*

Chamomile.

*Off.*—The flowers.

FLORES ANTHEMIDIS NOBILIS. *Ed.*

FLORES ANTHEMIDIS. Flores simplices. *Lond.*

FLORES CHAMÆMELI. *Dub.*

CHAMOMILE is a perennial plant, indigenous in the south of England, but cultivated in our gardens for the purposes of medicine. The flowers have a strong, not ungrateful, aromatic smell, and a very bitter nauseous taste.

Their active constituents are bitter extractive, and essential oil. To the latter is to be ascribed their antispasmodic, carminative, cordial, and diaphoretic effects; to the former, their influence in promoting digestion.

Neumann obtained from 480 parts, 180 of alcoholic extract, and afterwards 120 of watery; and reversing the procedure, 240 of watery, and 60 alcoholic.

*Med. use.*—Chamomile flowers are a very common and excellent remedy, which is often used with advantage in spasmodic diseases, in hysteria, in spasmodic and flatulent colics, in suppression of the menstrual discharge, in the vomiting of puerperal women, in the afterpains, in gout, in podagra, in intermittents, and in typhus.

As chamomile excites the peristaltic motion, it is useful in dysentery, but is not admissible in all cases of diarrhœa. From its stimulating and somewhat unpleasant essential oil, chamomile is also capable of exciting vomiting, especially when given in warm infusion; and in this way it is often used to assist the action of other emetics.

Externally, chamomile flowers are applied as a discutient and emollient, in the form of glyster or embrocation, in colic, dysentery and strangulated hernia, &c.

Chamomile flowers are exhibited,

1. In substance, in the form of powder, or rather of electuary, in doses of from half a drachm to two drachms, either alone, or combined with peruvian bark, as for the cure of intermittent fevers.

2. In infusion, in the form of tea. This may either be drunk warm, for promoting the action of emetics, or cold, as a stomachic.

3. In decoction or extract. These forms contain only the

extractive, and therefore may be considered as simple bitters.

4. The essential oil may be obtained by distillation. This possesses the antispasmodic powers in a higher degree than the simple flowers, but, on the contrary, does not possess the virtues depending on the presence of the bitter extractive.

*Sp.* 125. ANTHEMIS PYRETHRUM. *Ed. Lond. Dub.*
Pellitory of Spain.

*Off.*—The root.
RADIX ANTHEMIDIS PYRETHRI. *Edin.*
RADIX PYRETHRI. *Dub. Lond.*

THIS plant, though a native of warm climates, as Barbary, bears the ordinary winters of this country, and often flowers successively from Christmas to May. The roots also grow larger with us than those with which the shops are usually supplied from abroad. They are seldom so big as the little finger, and the best are dry, compact, of a brown colour, and not easily cut with a knife.

Pellitory root has no sensible smell; its taste is very peculiar, exciting a mixed sensation of coldness and acrimony succeeded by a great flow of saliva and durable tremulous pulsations in the tongue and other soft part which it touches, but less so than that of arum; the juice expressed from it has scarcely any acrimony, nor is the root itself so pungent when fresh, as after it has been dried. Neumann obtained from 960 parts of the dry root, only 40 of alcoholic extract, and afterwards 570 of watery, and by a reverse procedure, 600 of watery, and 20 of alcoholic extract. Both the alcoholic extracts were excessively pungent. Its acrimony, therefore, was derived from a resin. John confirmed the conclusions, and found that the greater part of the watery extract consisted of inulin.

*Med. use.*—The principal use of pellitory is for promoting the salival flux, as a masticatory; by this means it often relieves the toothach, some kinds of pains in the head, and lethargic complaints. A saturated tincture is the nostrum of some dentists. A vinous infusion is also useful in debility of the tongue.

ANTIMONIUM. *Stibium.*

Antimony.

The physical and chemical properties of this metal have been already described.

Antimony is found,

I. In its metallic state, at Stahlberg in Sweden, and Allemont in France.

II. Mineralized with sulphur.
1. Grey antimony.
*a.* Compact;
*b.* Foliated;
*c.* Striated;
*d.* Plumose.
2. Red antimony.

III. Oxidized. Mongez.
IV. Acidified.
1. Muriated.
2. Phosphated.

The grey ore of antimony is the state in which it is officinal, and also that in which it is most commonly found.

SULPHURETUM ANTIMONII. *Ed. Dub. Lond.*
Sulphuret of antimony.

WHATEVER opinion may be formed of the nomenclature adopted by the Edinburgh College in general, the propriety of the change which they have introduced in this, and similar instances, cannot be disputed; for while chemists, according to rational principles, designated simple substances by simple names, the same names continued to be given by pharmaceutical writers to compound states of these bodies. To have established, therefore, an uniformity of nomenclature in sciences so intimately allied, cannot fail to be considered as an improvement of the greatest importance.

Although sulphuretted antimony be a natural production, yet it is commonly sold in the form of loaves, which have been separated from the stony, and other impurities of the ore, by fusion, and a species of filtration. The ore is melted in conical well-baked earthen pots, having one or more small holes in their apices. The fire is applied round and above these pots; and as soon as the sulphuretted antimony melts, it drops through the holes into vessels placed beneath to receive it, while the stony and other impurities remain behind. As antimony is very volatile, the mouths and joinings of the pots must be closed and luted. The upper part of the loaves thus obtained is more spongy, lighter, and impure, than the lower, which is therefore always to be preferred. These loaves have a dark-grey colour externally, but on being broken they appear to be composed of radiated striæ, of a metallic lustre, having the colour of lead. The goodness of the loaves is estimated from their compactness and weight, from the largeness and distinctness of the striæ, and from their being entirely va-

porizable by heat. Lead has been sold for antimony; but its texture is rather foliated than striated, and it is not vaporizable. The presence of arsenic, which renders the antimony unfit for medical purposes, is known by its emitting the smell of garlic when thrown upon live coals, and by other tests mentioned under arsenic. The presence of manganese or iron is known by their not being volatilized by a red heat.

Antimony is obtained from its ores by gradually detonating in a large crucible four parts of sulphuretted antimony, three of crude tartar, and one and a half of dry nitrate of potash, reduced to a fine powder, and intimately mixed. The detonated mass is then to be fused, and poured into a heated mould, greased with a little fat, in which it is allowed to consolidate. It is then turned out, and the scoriæ are separated from the antimony, which will weigh about one-fourth part of the sulphuret employed. The scoriæ are a mixture of sulphuret of potass and of antimony, and may be preserved for other purposes.

Another method of obtaining antimony, is by melting three parts of sulphuretted antimony with one of iron. The sulphur quits the antimony, and combines with the iron.

*Medical use.*—Formerly antimony was given internally, but as its action depended entirely on the acid it met with in the stomach, its effects were very uncertain, and often violent. Cups were also made of antimony, which imparted to wine that stood in them for some time, an emetic quality. But both these improper modes of exhibiting this metal are now laid aside.

Sulphuretted antimony was employed by the ancients, in collyria, against inflammations of the eyes, and for staining the eye-brows black. Its internal use does not seem to have been established till towards the end of the fifteenth century; and even at that time it was by many looked upon as poisonous. But experience has now fully evinced, that it may be administered with perfect safety, being often used, particularly in chronic eruptions; that some of the preparations of it are medicines of great efficacy; and that though others are very violent emetics and cathartics, yet even these, by a slight alteration or addition, lose their virulence, and become mild in their operation.

*Off. Prep.*—Antimony is at present the basis of many officinal preparations, to be afterwards mentioned. But besides those still retained, many others have been formerly in use, and are still employed by different practitioners. The following table, drawn up by Dr Black, exhibits a distinct view of the whole, with the officinal names at that time.

DR BLACK'S TABLE OF THE PREPARATIONS OF ANTIMONY.

Medicines are prepared either from crude antimony, or from the pure metallic part of it called regulus.

*From Crude Antimony.*

I. By trituration.
Antimonium præparatum. Lond.
II. By the action of heat and air.
Flores antimonii sine addito.
Vitrum antimonii. Ed.
*Antimonium vitrificatum.* Lond.
Vitrum antimonii ceratum. Ed.
III. By the action of alkalies.
Hepar antimonii mitissimum.
*Regulus antimonii medicinalis.*
Hepar ad kermes minerale. *Geoffroi.*
Hepar ad tinct. antimonii.
Kermes minerale.
Sulphur antimonii præcipitatum. Ed. et Lond.
IV. By the action of nitre.
Crocus antim. mitissimus, *vulgo Regulus antim. medicinalis.*
Crocus antimonii. Ed. et. Lond.
Antimonii emeticum mitius. Boerh.
Antim. ustum cum nitro, *vulgo* Calx antimonii nitrata. Ed.
Antimonium calcinatum. Lond. *Vulgo Antimonium diaphoret.*
Antim. calcareo-phosphoratum, sive pulvis antimonialis. Ed.
*Pulvis antimonialis.* Lond.
V. By the action of acids.
Antim. vitriolat. Klaunig.
Antim. cathartic. Wilson.
Antimonium muriatum, *vulgo* Butyrum antim. Ed.
*Antimonium muriatum.* Lond.
Pulvis algarothi sive *Mercurius Vitæ.*
Bezoardicum minerale.
Antimonium tartarisatum, *vulgo* Tartarus emeticus. Ed.
*Antimonium tartarisatum.* Lond.
Vinum antimonii tartarisati. Ed. et Lond.
Vinum antimonii. Lond.

*From the Regulus.*

This metal, separated from the sulphur by different processes, is called *Regulus antimonii simplex*, *Regulus martialis*, *Regulus jovialis*, &c. From it were prepared,

I. By the action of heat and air,
Flores argentei, sive nix antimonii.
II. By the action of nitre.
Cerussa antimonii.
Stomachicum Poterii.
Antihecticum Poterii.
Cardiacum Poterii.

PREPARATIONS, which have their name from ANTIMONY, but scarcely contain any of it.

Cinnabaris antimonii.
Tinctura antimonii.

To this table of Dr Black's, which is left unaltered, I shall add another, of the officinal preparations, not taken from the mode of preparation, but from the nature of the product.

ANTIMONY is exhibited,

I. In its metallic state,
 Combined with sulphur.
 Sulphuretum antimonii. *E. D. L.*
 ———————— præparatum. *E. L. D.*

II. Oxidized.
 *a.* Protoxide,
 Antimonii oxidum. *L.*
 *b.* Protoxide combined with sulphur,
 1. Sulphuretum antimonii præcipitatum. *E.*
 2. Sulphur antimoniatum fuscum. *D.*
 *c.* Protoxide combined with muriatic acid,
 Oxidum antimonii nitro-muriaticum. *D.*
 *d.* Protoxide combined with tartaric acid and potass,
 Tartras antimonii. *E.*
 Antimonium tartarisatum. *L.*
 Tartarum antimoniatum, sive emeticum. *D.*
 *Dissolved in wine,*
 Vinum tartratis antimonii. *E.*
 Liquor antimonii tartarisati. *L.*
 *e.* Protoxide combined with phosphate of lime,
 Oxidum antimonii cum phosphate calcis. *E.*
 Pulvis antimonialis. *L. D.*

THESE are the principal preparations of antimony. In estimating their comparative value, we may attend to the following observations. All the metallic preparations are uncertain, as it entirely depends on the state of the stomach, whether they act at all, or operate with dangerous violence. The sulphuret is exposed, though in a less degree, to the same objections.

The preparations in which antimony is in the state of peroxide, are perfectly insoluble in any vegetable or animal acid, and are also found to be inert when taken into the stomach.

The remaining preparations of antimony, or those in which it is in the state of protoxide, are readily soluble in the juices of the stomach, and act in very minute doses. Of its saline preparations, only those can be used internally which contain a vegetable acid; for its soluble combinations with the simple

acids are very acrid and corrosive. In general, the surest and best preparations of antimony are those which contain a known quantity of the metal in its state of protoxide.

The general effects of antimonials are, in small doses, diaphoresis, nausea; in large doses, full vomiting and purging. Some allege that antimonials are of most use in fevers when they do not produce any sensible evacuation, as is said to be the case sometimes with James's powder. They therefore prefer it in typhus, and emetic tartar in synochus, in which there is the appearance at first of more activity in the system, and more apparent cause for evacuation.

### Aqua.
### Water.

Water does not enter the list of materia medica of any of the colleges, but it is so important an agent, both in the cure of diseases, and in the practice of pharmacy, that a brief account of its varieties and properties can scarcely be considered as superfluous.

The chemical properties of water have been already enumerated. Water should be perfectly transparent, and have neither smell nor taste, but it is never found perfectly pure; and, if green from iron, blue from copper, or brown from vegetable impregnation, it is unfit for the use of man. *Atmospheric water* comprehends snow and rain water. When collected in the open fields, it is the purest natural water: that which falls in towns, or is collected from the roofs of houses, is contaminated with soot, animal effluvia, and other impurities, although after it has rained for some time, the quantity of these diminishes so much, that Morveau says that it may be rendered almost perfectly pure by means of a little barytic water, and exposure to the atmosphere. Snow water is supposed to be unwholesome, but it is not very apparent upon what principle. Atmospheric water, after it falls, either remains on the surface of the earth, or penetrates through it until it meet with some impenetrable obstruction to its progress, when it bursts out at some lower part, forming a spring or well. The water on the surface of the earth, either descends along its declivities in streams, which gradually wearing channels for themselves, combine to form rivers, which at last reach the sea, or remain stagnant in cavities of considerable depth, forming lakes or ponds, or on nearly level ground forming marshes.

The varieties of spring water are exceedingly numerous; but they may be divided into the soft, which are sufficiently pure to dissolve soap, and to answer the purposes of pure wa-

ter in general; the hard, which contain earthy salts and decompose soap, and are unfit for many purposes, both in domestic economy and in manufactures; and the saline, which are strongly impregnated with soluble salts. When spring waters possess any peculiar character, they are called mineral waters. The purest springs are those which occur in primitive rocks, or in beds of gravel, or filter through siliceous strata. In general large springs are purer than small ones. Wells are in fact artificial springs and are more impure, as the soil which forms their filter contains more soluble matter. Hence our old wells contain finer water than new ones, as the soluble particles are gradually washed away. River water is in general soft, as it is formed of spring water, which by exposure becomes more pure, and of running surface water, which, although turbid, from particles of clay suspended in it, is otherwise very pure. It is purest when it runs over a rocky soil, and its course is rapid, and it is well adapted for the brewing of malt liquor, and other purposes which require great solvent power. Lake water is similar to river water. The water of marshes, on the contrary, is exceedingly impure, and often highly fetid, from the great proportion of animal and vegetable matters which are constantly decaying in them.

Mineral waters derive their peculiarity of character, in general, either from containing carbonic acid, or soda, not neutralized, sulphuretted hydrogen, purging salts, earthy salts, or iron; or from their temperature exceeding in a greater or less degree that of the atmosphere. The following are the most celebrated.

*a.* Warm springs.—Bath, Bristol, Buxton, Matlock, in England. Barege, Vichy, &c. in France. Aix-la-Chapelle, Borset, Baden, Carlsbad, and Toeplitz in Germany; and Pisa, Lucca, Baia, and many others, in Italy.

*b.* Carbonated springs.—Pyrmont, Seltzer, Spa, Cheltenham, Scarborough.

*c.* Alkaline.—Carlsbad, Aix-la-Chapelle, Barege, Toeplitz.

*d.* Sulphureous.—Enghien, Lu, Aix-la-Chapelle, Kilburn, Harrowgate, Moffat, and many in Italy.

*e.* Purging.—Sea water, Lemington Priors, Harrowgate, Lu, Carlsbad, Moffat, Pitcaithly, Toeplitz, Epsom, Seidlitz, Kilburn, and all brackish waters.

*f.* Calcareous.—Matlock, Buxton, and all hard waters.

*g.* Chalybeate.—Hartfell near Moffat, Peterhead, Denmark, Cheltenham, Pyrmont, Spa, Tunbridge, Bath, Scarborough, Vichy, Carlsbad, Lemington Priors.

*Medical use.*—Water is an essential constituent in the organization of all living bodies; and as it is continually expended during the process of life, that waste must be also continually supplied, and this supply is of such importance that it is not left to reason or to chance, but forms the object of an imperious appetite. When taken into the stomach, water acts by its temperature, its bulk, and the quantity absorbed by the lacteals. Water about 60° gives no sensation of heat or cold; between 66° and 45° it gives a sensation of cold, followed by a glow and increase of appetite and vigour; below 45° the sensation of cold is permanent and unpleasant, and it acts as an astringent and sedative; above 60° it excites nausea and vomiting, probably by partially relaxing the fibres of the stomach, for when mixed with stimulating substances it has not these effects. In the stomach and in the intestines it acts also by its bulk, producing the effects arising from the distention of these organs; and as the intestinal gases consist of hydrogen gas, either pure or carbonated, or sulphuretted, or phosphuretted, it is probably in part decomposed in them. It likewise dilutes the contents of the stomach and intestines, thus often diminishing their acrimony. It is absorbed by the lacteals, dilutes the chyle and the blood, increases their fluidity, lessens their acrimony, and produces *plethora ad molem.* Its effects in producing plethora and fluidity are however very transitory, as it at the same time increases the secretion by the skin and kidneys. Indeed, the effects of sudorifics and diuretics depend, in a great measure, on the quantity of water taken along with them.

Mineral waters have also a specific action depending on the foreign substances which they contain. It is however necessary to remark, that their effects are in general much greater than might be expected from the strength of their impregnations, owing, probably, to the very circumstance of their great dilution, by which every particle is presented in a state of activity, while the lacteals admit them more readily than they would in a less diluted state.

Carbonic acid gas gives to the waters which are strongly impregnated with it a sparkling appearance, and an agreeable degree of pungency. In its effects on the body it is decidedly stimulant, and even capable of producing a certain degree of transient intoxication. It is of great service in bilious complaints, atony of the stomach, nausea, and vomiting, and in all fevers of the typhoid type.

Alkaline waters produce also a tonic effect on the stomach, but they are less grateful. They are particularly serviceable

in morbid acidity of the stomach, and in diseases of the urinary organs.

Sulphureous waters are chiefly used in cutaneous and glandular diseases. Their effects are stimulant and heating, and they operate by the skin or bowels.

Purging waters derive their effects from the neutral salts they contain, especially the muriates of soda, lime, and magnesia, and the sulphates of soda and magnesia. They are much more frequently used for a length of time to keep the bowels open by exciting the natural action, than to produce full purging. Used in this way, instead of debilitating the patient, they increase his appetite, health, and strength.

Chalybeate waters are used as tonics. They stimulate considerably, and increase the circulation; but as they also generally contain neutral salts, they act as gentle laxatives. They are used in all cases of debility, cachexia, chlorosis, fluor albus, amenorrhœa, and in general in what are called nervous diseases.

The external use of water depends almost entirely on its temperature, which may be,

1. Greater than that of the body, or above 97° F. The hot bath.
2. below the temperature of the body.
   *a.* From 97 to 85, the warm bath.
   *b.* From 85 to 65, the tepid bath.
   *c.* From 65 to 32, the cold bath.

The hot bath is decidedly stimulant in its action. It renders the pulse frequent, the veins turgid, the skin red, the face flushed, the respiration quick, increases animal heat, and produces sweat. If the temperature be very high, the face becomes bathed in sweat, the arteries at the neck and temples beat with violence, anxiety and a sense of suffocation are induced, and, if persisted in, vertigo, throbbing in the head, and apoplexy, are the consequences. It is very rarely employed in medicine, except where there are hot springs, as at Baden in Switzerland. The Russians, and some other nations, use the hot bath as an article of luxury.

The effects of the affusion of hot water have not been ascertained, and it is probable that when the heat is not so great as to destroy the organization of the skin, the very transient application of the water would be more than counteracted by the subsequent evaporation.

With regard to the action arising from their temperature, all baths below 97° differ only in degree, as they all ultimately abstract caloric from the surface, but with a force inversely as their temperature.

The warm bath excites the sensation of warmth, partly because our sensations are merely relative, and partly because its temperature, though less than that of the internal parts of the body, is actually greater than that of the extremities, which are the chief organs of touch. But as water is a much better conductor of caloric than air, and especially than confined air, as much caloric is abstracted from the body by water, which is only a few degrees lower than the internal temperature of the body, as by air of a much lower temperature. The warm bath diminishes the frequency of the pulse, especially when it has been previously greater than natural, and this effect is always in proportion to the time of immersion. It also renders the respiration slower, and lessens the temperature of the body, relaxes the muscular fibre, increases the bulk of the fluids by absorption, removes impurities from the surface, promotes the desquamation and renewal of the cuticle, and softens the nails and indurations of the skin.

The stimulant power of the warm bath is therefore very inconsiderable, and its employment in disease will be chiefly indicated by preternatural heat of the surface and frequency of the pulse, rigidity of the muscular fibre, and morbid affections of the skin. It has accordingly been found serviceable in many cases of pyrexia, both febrile and exanthematous, in many spasmodic diseases, and in most of the impetigines. It is contra-indicated by difficulty of breathing, and internal organic affections, and should not be used when the stomach is full.

The affusion of warm water very generally produces a considerable diminution of heat, a diminished frequency of pulse and respiration, and a tendency to repose and sleep; but its effects are not very permanent, and its stimulus is weak. It is recommended in febrile diseases depending on the stimulus of preternatural heat, and in those attended with laborious respiration, and in the paroxysms of hectic fever.

As the tepid bath and affusion produce effects intermediate between those of warm and cold water, it is unnecessary to enumerate them.

The cold bath produces the sensation of cold, which gradually ceases, and is succeeded by numbness. It excites tremors in the skin, and shivering. The skin becomes pale, contracted, and acquires the appearance termed *cutis anserina.* The fluids are diminished in volume, the solids are contracted, the caliber of the vessels is lessened, and therefore numbness and paleness are induced, and the visible cutaneous veins become smaller. There is a sense of drowsiness and inactivity, the joints become rigid and inflexible, and the limbs are affected with pains and spasmodic contractions. The respira-

tion is rendered quick and irregular, the pulse slow, firm, regular, and small; the internal heat is at first diminished, but gradually and irregularly returns nearly to its natural standard; the extremities, however, continue cold and numb, or swollen and livid; the perspiration is suppressed, and the discharge of urine is rendered more frequent and copious. If the cold be excessive on its application, long-continued violent shiverings are induced, the pulse ceases at the wrist, the motion of the heart becomes feeble and languid, there is a sensation of coldness and faintness at the stomach, and a rapid diminution of animal heat; and at last, delirium, torpor, and death, are the consequences. If the application of the cold bath be not carried to an excessive length, on emerging from the water, the whole body is pervaded by an agreeable sensation of warmth, and the patient feels refreshed and invigorated.

The primary action of the cold bath is stimulant, and the degree of this action is in proportion to the lowness of its temperature. This opinion is indeed directly opposite to a theory of cold which has been advanced with the confidence of demonstration. "Heat is a stimulus; cold is the abstraction "of heat; therefore cold is the abstraction of stimulus, or is "a sedative." To this we might oppose another theory, equally syllogistic, and nearer the truth: Free caloric is a stimulus; cold is the sensation excited by the passage of free caloric out of the body; therefore cold is a stimulus. But, in fact, the action of cold is by no means so simple. It is complicated, and varies according to its intensity, duration, and the state of the system to which it is applied. It acts at first as a stimulant, in exciting sensation; then as a tonic, in condensing the living fibre; and, lastly, however parodoxical it may appear, as a sedative, by preventing that distribution of blood in the minute and ultimate vessels, which is necessary for the existence of sensibility and irritability, and by the abstraction of the stimulus of heat.

The cold bath may be therefore so managed as to procure any of these effects by regulating the length of time for which it is applied.

Cold affusion, or the pouring of cold water over the body, is a very convenient way of applying the cold bath in many cases. In this way cold is very suddenly applied to the surface, its operation is instantaneous and momentary, but may be continued by repeated affusions for any length of time, and so as to produce its extreme effects. Where the effects of cold affusion may be thought too severe, sponging the body with cold water, or water and vinegar, may be substituted.

The application of cold may be employed in fevers and fe-

brile paroxysms, when the heat is steadily above the natural standard, and in many diseases arising from relaxation and debility. It is contra-indicated when the heat of the body is below 97°, when there is any notable perspiration from the surface, and when there is general plethora. Irritable habits should be defended from the violence of its action, by covering the body with flannel.

In ardent fever, especially in those cases in which the heat of the skin is excessive, it is particularly useful, and ought to be long continued. In phrenitis, and other local inflammations, it promises to be of advantage. In gout its effects are doubtful, being in some instances salutary, in others destructive. A criterion, to enable us to determine when it ought or ought not to be resorted to in this disease, is much wanted. In inflammatory rheumatism and rheumatic gout it is decidedly useful. It is of advantage in all the hæmorrhagies and exanthemata; in tetanus, colic, cholera, hysteria, mania, ischuria, and in burns; and in general in all those local diseases in which solutions of acetate of lead, of muriate of ammonia, &c. are usually employed; for the good effects of these depend almost entirely on their diminished temperature.

Arbutus uva ursi. *Ed. Dub. Lond.*

Willd. *g.* 871, *sp.* 7. Smith, *g.* 203, *sp.* 3.—*Decandria Monogynia.*—Nat. ord. *Bicornes.*

Whortleberry. Red-berried trailing arbutus.

*Officinal.*—The leaves.

Folia arbuti uvæ ursi. *Ed.*

Folia uvæ ursi. *Lond. Dub.*

This is a very small evergreen shrub. The leaves are oval, not toothed, and their under surface is smooth and pale green. It grows wild in the woods, and on sand hills in Scotland, and in almost every country in Europe. It is also very common in New England and other parts of America. The *green* leaves alone, Dr Bourne says, should be selected and picked from the twigs, and dried by a moderate exposure to heat. The powder, when properly prepared, is of a light brown colour, with a shade of greenish yellow, has nearly the smell of good grass hay, as cut from the rick, and to the taste is at first smartly astringent and bitterish, which sensations gradually soften into a liquorice flavour. Digested in alcohol they give out a green tincture, which is rendered turbid by water, and when filtered passes transparent and yellow, while a green resin remains on the filter. They are powerfully astringent, approaching, in the deepness of the colour which they give to red sulphate of iron, more nearly to nutgalls

than any substance I have tried. Indeed, in some parts of Russia they are used for tanning.

*Medical use.*—The medical effects of this medicine depend entirely on its astringent and tonic powers. It is therefore used in various fluxes arising from debility, menorrhagia, fluor albus, cystirrhœa, diabetes, enuresis, diarrhœa dysentery, &c. It has been strongly recommended in phthisical complaints by Dr Bourne, and in diseases of the urinary organs by De Haen, particularly in ulcerations of the kidneys and bladder. With this view it is a popular remedy in America, and Dr Barton recommends it strongly in nephritic complaints and in gleet. It certainly alleviates the dyspeptic symptoms accompanying nephritic complaints. It is commonly given in the form of powder, in doses of from 20 to 60 grains three or four times a-day.

ARCTIUM LAPPA. *Ed. Dub.*

Willd. *g.* 1429, *sp.* 1. Smith, *g.* 352. *sp.* 1. *Syngenesia Polygamia Æqualis.*—Nat. ord. *Compositæ Capitatæ.*

Burdock. Clit-bur.

*Officinal.*—The root.

RADIX ARCTII LAPPÆ. *Ed.*

RADIX BARDANÆ. *Dub.*

THIS is a perennial plant, which grows wild in uncultivated places. The seeds have a bitterish subacrid taste; they are recommended as very efficacious diuretics, given either in the form of emulsion, or in powder, to the quantity of a drachm. The roots taste sweetish, with a light austerity and bitterishness. they are esteemed aperient, diuretic, and sudorific, and are said to act without irritation, so as to be safely ventured upon in acute disorders. Decoctions of them have been used in rheumatic, gouty, venereal, and other disorders, and are preferred by some to those of sarsaparilla.

ARGENTUM. *Ed.*

ARGENTUM; Argentum purificatum. *Lond.*

ARGENTUM in laminas extensum. *Dub.*

Silver. Silver leaf.

THE chemical and physical properties of silver have been already enumerated.

Silver is found,

I. In its metallic state;

1. Pure.
2. Alloyed with gold. Auriferous silver ore.
3. ———— antimony.

4. Alloyed with iron and arsenic.
5. ———— bismuth.

II. Combined with sulphur;
1. Sulphuretted silver. Vitreous silver ore.
2. ———— with antimony, iron, arsenic, and copper. Black or brittle silver ore.
3. Sulphuretted silver, with copper and antimony. Black silver ore.
4. ———— with lead and antimony. White silver ore.

III. Oxidized;
1. Combined with carbonic acid and antimony.
2. ———— muriatic acid.
   *a.* Corneous silver ore.
   *b.* Earthy silver ore.
   *c.* Sooty silver ore.
3. Combined with sulphur and oxide of antimony. Red silver ore.
———— molybdic acid.

ARISTOLOCHIA SERPENTARIA. *Ed. Lond. Dub.*

*Gynandria Hexandria.*—Willd. *g.* 1609, *sp.* 27. Nat. ord. *Sarmentosæ.*

Virginian Snake-root.

*Officinal.*—The root.

RADIX ARISTOLOCHIÆ SERPENTARIÆ. *Ed.*

RADIX SERPENTARIÆ. *Lond.*

RADIX SERPENTARIÆ VIRGINIANÆ. *Dub.*

THIS is a small, light, bushy root, consisting of a number of strings or fibres matted together, issuing from one common head; of a brownish colour on the outside, and paler or yellowish within. It has an aromatic smell, like that of valerian, but more agreeable; and a warm, bitterish, pungent taste, very much resembling that of camphor. I find that, treated with alcohol, it affords a bright green tincture, which is rendered turbid by water; by filtration a small portion of a green matter is separated, but its transparency is not restored. It neither precipitates tannin or gelatin, nor affects the salts of iron or tincture of turnsole. When the diluted tincture is distilled, the spirit and tincture pass over milky, strongly impregnated with its peculiar flavour.

*Medical use.*—Its virtues are principally owing to the essential oil with which it abounds. Its general action is heating and stimulant; its particular effects, to promote the discharge by the skin and urine. In its effects it therefore coincides with camphor, but seems to be a more permanent stimulus.

It is recommended,

1. In intermittent fevers, especially when the paroxysms do not terminate by sweating, and to assist the action of Peruvian bark in obstinate cases. In America, its tincture or infusion is the common morning dram in aguish situations.
2. In typhus and in putrid diseases, to support the *vis vitæ*, and to excite gentle diaphoresis.
3. In exanthematous diseases, when the fever is of the typhoid type, to support the action of the skin and keep out the eruption.
4. In gangrene. Externally it is used as a gargle in the putrid sore throat.

It is exhibited,

1. In powder, which is the best form, in doses of twenty or thirty grains.
2. In infusion with wine or water. By decoction its powers are entirely destroyed.

It is often combined with Peruvian bark, or with camphor.

ARNICA MONTANA. *Ed. Dub.*

Willd. *g.* 1491, *sp.* 1. *Syngenesia Polygamia superflua.*—Nat. ord. *Compositæ radiatæ.*

German Leopard's bane.

*Officinal.*—The flowers and root.

*a)* FLORES ARNICÆ MONTANÆ. *Ed.*
FLORES ARNICÆ. *Dub.*

LEOPARD'S-BANE is a very common perennial plant in the alpine parts of Germany, in Sweden, Lapland, and Switzerland. The flowers, which are of a yellow colour, and compound, consisting entirely of tubular florets, are distinguished from similar flowers, with which they are often mixed, from ignorance or fraud, by the common calyx, which is shorter than the florets, and consists entirely of lancet-shaped scales, lying parallel, and close to each other, of a green colour, with purple points. The calyx of the different species of Inula is composed of bristle shaped scales, reflected at the points, and beset with hairs. The florets of the genus Hypochæris are strap shaped.

These flowers have a weak bitterish taste, evidently combined with a degree of acrimony; and when rubbed with the fingers have a somewhat aromatic smell. Their active constituents are not sufficiently ascertained. Mercier has endeavoured to shew that they owe their acrimony to the agency of

insects upon them, and that naturally they contain aromatic principle, and modified tannin. But in their ordinary state they contain also an acrid resin and an unexamined peculiar vegetable principle, as pointed out by Weber.

*Medical use.*—In their effects they are stimulating, and supposed to be discutient. In small doses, and properly administered, they possess very beneficial effects, in raising the pulse, in exciting the action of the whole sanguiferous system, in checking diarrhœas, in promoting expectoration, and, most particularly, in removing paralytic affections of the voluntary muscles; but their use is frequently attended with no sensible operation, except that in some cases of paralysis, the cure is said to be preceded by a peculiar prickling, and by shooting pains in the affected parts. When given improperly, or in too large doses, they excite an insupportable degree of anxiety, shooting and burning pains, and even dangerous hæmorrhagies, vomiting, vertigo, and coma. For these dangerous symptoms, vinegar is said to be the best remedy.

They have been recommended,

1. In paralytic disorders, in chronic rheumatism, in retention of the urine, from paralysis of the bladder, in amaurosis.
2. In intermittent fevers, combined with Peruvian bark.
3. In dysentery and diarrhœa, but in some cases they have had bad effects.
4. In putrid diseases.
5. In typhoid inflammations.
6. To promote the uterine discharge.
7. And in internal pains, and congestions from bruises.

In the countries where they are indigenous, the flowers of the leopard's-bane have long been a popular remedy in these accidents.

They are contra-indicated by an inflammatory diathesis, a predisposition to haemorrhagies, and internal congestions.

They are best exhibited in the form of infusion. One or two scruples may be infused with half a pound of water, and drunk at proper intervals. The flowers should be wrapt up in a piece of linen, as otherwise their down is apt to be diffused in the liquid, and to cause violent irritation of the throat.

*Officinal.*—The root.

*b*) Radix arnicæ. *Dub. Ed.*

The dried root of this plant is about the thickness of a small quill, and sends out fibres along on one side. Externally it is rough, and of a red brown colour, internally of a dirty white. Its taste is acrid, and slightly bitter. Neumann ex-

tracted from 960 parts 840 watery extract, and 5 alcoholic; and inversely 270 alcoholic, and 540 watery.

*Medical use.*—It is exhibited in the same manner and circumstances as the flowers, but is more apt to excite vomiting. In powder its dose is from five to ten grains.

ARSENICUM.
Arsenic.

THE general properties of this metal have been already enumerated.

Arsenic is found,

I. In its metallic state:
  1. Alloyed with iron. Native Arsenic.
  2. ——— iron and gold.
  3. ——— cobalt.
  4. Combined with iron and sulphur. Arsenical pyrites.
  5. ——— iron, sulphur, and silver. White arsenical pyrites.

II. Oxidized:
  1. Uncombined. White oxide of arsenic. Arsenious acid.
  2. Combined with sulphur.
    *a*. Oxide of arsenic 90, sulphur 10. Orpiment. Yellow sulphuretted arsenic.
    *b*. Oxide of arsenic 84, sulphur 16. Realgar. Red sulphuretted arsenic.

III. Acidified and combined:
  1. With lime.
  2. With copper.
  3. With iron.
  4. With lead.
  5. With nickel.
  6. With cobalt.

OXIDUM ARSENICI. *Ed.* S. S. *Oxydum arsenici album. Lond.*
ARSENICUM; Oxydum album. *Dub.*
Oxide of arsenic. Arsenious acid, Fourcroy.

THIS substance, which was formerly named, improperly, Arsenic, is most generally obtained in the process of roasting the ores of cobalt in Saxony. The roasting is performed in a kind of reverberatory furnace, with which a very long chimney is connected, lying in a horizontal direction. The arsenious acid is condensed in it in the form of a loose grey powder, which,

by a second sublimation with a little potash, and in a great degree of heat, coalesces into a firm vitreous sublimate, which gradually becomes opaque by exposure to the air. In this state it is the white arsenic of commerce, or, as it should be termed, the arsenious acid. For internal use, the lumps of a shining appearance and dazzling whiteness should be chosen ; but it is generally offered to sale in the form of powder, which is very often mixed with chalk or gypsum. The fraud is easily detected by exposing it to heat. The arsenious acid is entirely sublimed, and the additions remain behind.

As this substance is one of the most virulent poisons, we shall give a full account of its properties. It is white, compact, brittle, and of a glassy appearance. Its taste is sweetish, but acrid, and slow in manifesting itself. It sublimes entirely when exposed to 283° Fahrenheit. When the operation is performed in close vessels, the arsenious acid sublimes in dense white fumes, which concrete into tetrahedrons, but the crystals become gradually opaque on exposure to the air. Arsenious acid is soluble in 80 waters at 60°, and in 15 at 212°. This solution has an acrid taste, and reddens vegetable blues. It is also soluble in 80 times its weight of boiling alcohol. From either solution it may be obtained regularly crystallized in tetrahedrons. From its solutions a white precipitate is thrown down by lime-water, a yellow precipitate by sulphuretted hydrogen, or water impregnated with it, or by any alkaline sulphuret or hydro-sulphuret, and, still more characteristically, a fine green precipitate by a solution of sulphate of copper, and a copious yellow precipitate by a solution of nitrate of silver. But as the addition of an alkali, in order to saturate the acid, is necessary to the success of these metallic tests, the liquid ammoniarets of copper and of silver are preferable, and indeed the best fluid tests we possess. Mixed with a little sulphur, it sublimes of an orange or red colour. When treated with nitric acid, the arsenious acid is converted into arsenic acid. But by far the surest test of the presence of arsenic, is its reduction by carbonaceous substances. With this view, a small quantity of any suspected substance may be mixed with some carbonaceous or fatty or oily matter, and introduced within a tub closed at the bottom, and exposed to a red heat; if arsenic be present in any state, it will be sublimed in the form of brilliant metallic scales. By means of a small tube and a blowpipe, a very small quantity may be detected in this way. If arsenic be reduced between copper-plates, or in contact with copper-filings, it whitens them, and, lastly, the fumes of reduced arsenic have a strong alliaceous smell.

Arsenious acid is used by the dyers, as a flux in glass making, in docimastic works, and in some glazes. Arsenious sulphurets are much used by painters, but these advantages are not able to compensate for its bad effects. In mines, it causes the destruction of numbers who explore them; being very volatile, it forms a dust, which affects and destroys the lungs, and the unhappy miners, after a languishing life of a few years, all perish sooner or later. The property which it possesses of being soluble in water, increases and facilitates its destructive power; and it ought to be proscribed in commerce, by the strict law which prohibits the sale of poisons to unknown persons. Arsenious acid is every day the instrument by which victims are sacrificed, either by the hand of wickedness or imprudence. It is often mistaken for sugar, and these mistakes are attended with the most dreadful consequences. The only symptoms which characterize this poison are, extreme pains in the stomach and bowels, vomiting of glairy and bloody matter, purging, with cold sweats and trembling. Sometimes there is no pain, only debility and fainting, with vomiting and purging.

On dissection, the stomach and bowels are sometimes found to be inflamed, gangrenous, and corroded or corrugated. The lungs are frequently marked with livid spots. Sometimes there is no morbid appearance to be discovered. The state of the blood is very various, as well as the external appearance of the body, which is sometimes perfectly natural. When the quantity is so very small as not to prove fatal, tremors, palsies, and lingering hectics succeed.

Mucilaginous drinks have been long ago given to persons poisoned by arsenic. Milk, fat, oils, and butter, have been successively employed. M. Navier has proposed, as a more direct counter-poison, one drachm of sulphuret of potass to be dissolved in a pint of water, which the patient is directed to drink at several draughts; the sulphur unites to the arsenic, and destroys its causticity and effects. When the first symptoms are alleviated, he advises the use of sulphureous mineral waters. He likewise approves the use of milk, but condemns oils. Vinegar, which dissolves arsenic, has been recommended by M. Sage. According to Hahneman, a solution of soap is the best remedy. One pound of soap may be dissolved in four pounds of water, and a cupful of this solution may be drunk lukewarm every three or four minutes. But M. Orfila agrees with Renault in thinking, that no antidote has yet been discovered. Bloodletting has lately been recommended in cases of poisoning from arsenic, on the idea that it kills by inducing inflammation.

*Medical use.*—Notwithstanding the very violent effects of arsenious acid, it has, however, been employed in the cure of diseases, both as applied externally, and as taken internally.

Externally, it has been chiefly employed in cases of cancer.

Justamond used an ointment composed of four grains of white oxide of arsenic, ten grains of opium, and a drachm of cerate, spread very thin upon linen. But its action is tedious. He also fumigated cancerous sores with sulphuret of arsenic, with a view to destroy their intolerable fetor, with great success. Le Febure washed cancerous sores frequently, in the course of the day, with a solution of four grains of arsenious acid in two pounds of water. Arnemann recommends an ointment of one drachm of arsenious acid, the same quantity of sulphur, an ounce of distilled vinegar, and an ounce of ointment of white oxide of lead, in cancerous, and obstinate ill-conditioned sores, and in suppurated scrofulous glands. The arsenious acid has even been applied in substance, sprinkled upon the ulcer. But this mode of using it is excessively painful, and extremely dangerous. There have been even fatal effects produced from its absorption.

The principal thing to be attended to in arsenical applications is to diminish their activity to a certain degree. They then cause little irritation or pain, but rather excite a gentle degree of inflammation, which causes the diseased parts to be thrown off, as if they were foreign substances, while they have the peculiar advantage of not extending their operation laterally.

No other escharotic possesses equal powers in cancerous affections; but, unfortunately, its good effects often do not go beyond a certain length; and if in some cases it effects a cure, in others it must be allowed that it does harm. While it has occasioned very considerable pain, it has given the parts no disposition to heal, the progress of the ulceration becoming even more rapid than before.

Internally, it may be exhibited in the form,

1. Of arsenious acid dissolved in distilled water, in the proportion of four grains to a pint. A table spoonful of this solution, mixed with an equal quantity of milk, and a little syrup of poppies, is directed to be taken every morning fasting, and the frequency of the dose gradually increased until six table spoonfuls be taken daily. M. Le Febure's method of curing cancer.
2. Of arsenite of potass. Sixty four grains of arsenious acid, with an equal quantity of carbonate of potass, are to be boiled together until the arsenious acid be dissol-

ved, when as much water is to be added as will increase the solution to one pound. Of this, from two to twelve drops may be given once, twice, or oftener, in the course of a day. Dr Fowler's method of curing intermittent fever.

3. Of arseniate of potass. Mix well together equal quantities of nitrate of potass, and of pure arsenious acid; put them into a retort, and distil it first with a gentle heat, and afterwards with so strong a heat as to redden the bottom of the retort. In this process the nitric acid is partly decomposed, and passes over into the receiver in the state of nitrous acid. The arsenious acid is at the same time converted into arsenic acid, and combines with the potass. The product, which is arseniate of potass, is found in the bottom of the retort, and may be obtained in the form of crystals, of a prismatic figure, by dissolving it in distilled water, filtering the solution through paper, evaporating, and crystallizing. A preparation of M. Macquer's.
4. Arsenious acid, in substance, to the extent of an eighth of a grain for a dose, combined with a little sublimed sulphur, has been said to be exhibited in some very obstinate cases of cutaneous diseases, and with the best effect.
5. Combined with six times its weight of black pepper, it is given by the native physicians in the East Indies for the cure of the Persian fire (syphilis,) and a species of elephantiasis, called juzam.

The internal use of arsenic has been lately much extended, in consequence of the observations of Dr Fowler, Mr Jenkinson, Dr Bardsley, Dr Kellie, Mr Hill, &c. Before Dr Fowler wrote, it was indeed in use empirically, for the cure of cancers, and even as a popular remedy, in various countries; as in the East Indies, against cutaneous affections; and in the fens of Hungary and Lincolnshire, against the ague. But Dr Fowler first, by that inductive method of ascertaining its effects which he so successfully practised, recommended it to the notice of regular practitioners. He confined himself to the advantages derived from it in periodical diseases; and Mr Jenkinson has, more recently, extended the use of it to certain painful affections of the bones, cases of "very long standing, attended with great debility, and local affections, not of the muscles and integuments, but of the ends of the bones, cartilages, or ligaments, or of all three together." He thinks it hurtful in recent affections, except where there are regular

intermissions, and in the disease described by Dr Haygarth, under the title of nodosity of the joints. For a complete list of the diseases in which it has been tried, Mr Hill's paper in the Edinburgh Medical Journal may be consulted.

The great difficulty attending the exhibition of so very active a remedy, is regulating the dose so as to produce the full effect, without carrying it farther than is absolutely necessary. Dr Kellie has accurately pointed out the precautions to be observed with this view. He always gives arsenic immediately after meals, under the idea that it will be less apt to affect the stomach when full than when empty. "From all I have observed, I have little apprehension of risk in a guarded and judicious use of the arsenical solution. It will always be proper to begin with the smallest doses, in order to ascertain how it agrees with the stomach. Having suited the dose to this, the feeling of swelling and stiffness of the palpebræ and face, heat, soreness, and itching of the tarsi, or tenderness of the mouth, are proofs that the medicine is exerting its specific effects on the constitution; that the dose has been carried to a sufficient length; and that it is time to decrease the dose, and attentively to watch its future effects. On the appearance of erythema, or salivation, it is time to interrupt altogether, for a while, the exhibition of arsenic; if necessary, it may be resumed when these symptoms have vanished. If pain of the stomach, nausea, or vomiting supervene; if the head be affected with pain or vertigo; or should a cough, with any signs of irritation of the pulmonary organs, be observed, the use of arsenic should be totally and for ever abandoned."

ARTEMISIA.

Willd. *g.* 1743, *Syngenesia Polygamia superflua.*—Nat. ord. *Compositæ discoideæ.*

*Sp.* 8. ARTEMISIA ABROTANUM. *Dub.*

Southernwood.

*Off.*—The leaves.

FOLIA ABROTANI. *Dub.*

THIS is a perennial shrub, which grows readily in our gardens, though a native of the south of Europe.

Southernwood has a strong smell, which to most people is not disagreeable; it has a pungent, bitter, and somewhat nauseous taste. These qualities are very completely extracted by alcohol, and the tincture is of a beautiful green colour. They are less perfectly extracted by watery liquors, the infusion being of a light brown colour.

*Med. use.*—Southernwood, as well as some other species of

the same genus, has been recommended as an anthelmintic: and it has also been sometimes used as stimulant, detergent, and sudorific. Externally, it has been employed in discutient and antiseptic fomentations; and, under the form of lotion and ointment, for cutaneous eruptions, and for preventing the hair from falling off. But it is at present very rarely used in any way.

*Sp.* 42. ARTEMISIA MARITIMA. *Dub.*
Sea Wormwood.

*Off.*—The tops.
CACUMINA ABSYNTHII MARITIMI. *Dub.*

THIS species of artemisia is perennial and herbaceous. It grows wild in salt marshes, and in several parts about the sea-coasts. In taste and smell, it is weaker and less unpleasant than the common wormwood, and is now almost rejected from practice.

*Sp.* 26. ARTEMISIA SANTONICA. *Ed. Dub.*
Wormseed.

*Off.*—The tops.
CACUMINA ARTEMISII SANTONICI. *Ed.*
CACUMINA SANTONICI. *Dub.*

THE Edinburgh and Dublin Colleges have given this species as the plant which produces these seeds; but the fact is by no means ascertained. They have been ascribed by different writers to other species of the same genus, the Judaica, the Contra, and the Austriaca, and are even said by Saunders to be the produce of a species of Chenopodium.

The seeds themselves are small, oblong, smooth, and of a greenish or greyish yellow colour. As the whole head is gathered after the seeds are ripe, they are mixed with the scales of the calices, and bits of stalks. Their taste is bitter, and somewhat acrid; their smell strong and disagreeable. Those which come from Aleppo are esteemed the best, and those from Barbary the worst. When they have no smell, and a less intensely bitter taste, and are discoloured, and mixed with a longer kind of seed, they are to be rejected. They are also adulterated with the seeds of tansy and wormwood. The latter are easily known, by having a light yellow colour, and resembling powdered hay more than seeds. Neumann obtained from 480 parts, 213 of alcoholic extract, and 110 watery; and inversely, 260 watery, and 28 alcoholic. It gave a slight flavour to water distilled from it, but no oil.

*Med. use.*—Wormseed, although recently rejected by the

London College, is one of the oldest and most common anthelmintics, especially in the lumbrici of children. On account of their essential oil, they are heating and stimulating.

They are given to children,

1. In substance, to the extent of ten grains, or half a drachm, finely powdered, and strewed on bread and butter; or made into an electuary with honey or treacle; or candied with sugar; or diffused through milk, and taken in the morning, when the stomach is empty.
2. In infusion or decoction; but to these forms their bitterness is a strong objection.

After they have been used for some days, it is customary to give a cathartic, or they are combined, from the beginning, with rhubarb, jalap, calomel, sulphate of iron, or muriate of ammonia.

*Sp.* 63. ARTEMISIA ABSINTHIUM. *Ed. Dub. Lond.*
Common wormwood.

*Off.*—The leaves and flowering heads.

*a)* ABSINTHIUM. *Lond.*
FOLIA ABSINTHII VULGARIS. *Dub.*
FOLIA ARTEMISIAE ABSINTHII. *Ed.*

*b)* CACUMINA ABSYNTHII VULGARIS. *Dub.*
SUMMITATES ARTEMISIAE ABSYNTHII. Summitates florentes. *Ed.*

THIS perennial herb grows by the road-sides, and on rubbish, in many parts of Britain: and about London it is cultivated for medical use. Its smell is strong and disagreeable; its taste intensely bitter. Its active constituents are bitter extractive and essential oil. It is used in stomach complaints, and is of great service to hypochondriasts. It is also employed in intermittent fevers, in cachectic and hydropic affections, in jaundice, and against worms. The herb is used in antiseptic fomentations, and macerated in water is applied to bruises to prevent the swelling and discolouration. Many persons cannot suffer the disagreeable smell of wormwood, which is apt to occasion headach; but it may be freed from it in a great measure by decoction. The extract is a pure and simple bitter. The essential oil is of a dark green colour, and contains the whole flavour of the plant. It is stimulating, and is supposed to be a powerful antispasmodic and anthelmintic. Wormwood was formerly much used for the preparation of medicated wines and ales.

ARUM MACULATUM. *Dub.*

*Monœcia Polyandria.* Willd. *g.* 1705, *sp.* 17. Smith, *g.* 402, *sp.* 1.—Nat. ord. *Piperitæ.*

Wake robin.

*Officinal.*—The recent root.

RADIX RECENS ARI. *Dub.*

THIS is a perennial solid bulbous-rooted-plant, which grows wild in shady situations, and by the sides of banks, in many parts of Britain. The root is knotty, roundish, and white. When collected in spring, before the leaves shoot, or in autumn, after flowering, it contains a very acrid milky juice. Applied to the tongue, it causes a burning heat, which lasts for many hours, and excites considerable thirst. These disagreeable symptoms may be relieved by butter-milk or oily fluids. Rubbed between the fingers, it blisters and excoriates them; it is therefore a corrosive vegetable poison. By drying, it loses the greatest part of its acrimony, and becomes simply amylaceous. It is also rendered perfectly mild by frequent washing with water. Its acrimony does not rise in distillation, either with alcohol or with water, and is not contained in its extract, although the root is thereby deprived of it. Neumann obtained from 480 of the dry root, 20 of alcoholic extract, and about 180 watery. The former had some slight pungency, the latter none. Its acrimony is therefore easily destructible; and as it does not arise from the presence of an essential oil, it depends upon a vegetable principle, different from all others, and not well understood.

*Medical use.*—In the recent root, the degree of acrimony is so very uncertain, and often so excessive, that its effects, as an internal remedy, cannot be depended on. The dried root is perfectly inert, so much so, that the French prepare from it the harmless but high-priced cosmetic, called *Cypress powder:* but the fresh root may be kept in a state fit for medical use for a year, by burying it in a cellar in sand. It is given in chlorotic cachectic cases, and in a relaxed state of the stomach supposed to arise from an accumulation of phlegm, and in some rheumatic affections, in the dose of ten or fifteen grains, three times a-day, in the form of a conserve or bolus.

ASARUM EUROPÆUM. *Ed. Dub. Lond.*

Willd. *g.* 925. *sp.* 1. Smith, *g.* 222. *sp.* 1. *Dodecandria Monogynia.*—Nat ord. *Sarmentaceæ.*

Asarabacca.

*Officinal.*—The leaves.

FOLIA ASARI EUROPÆI. *Ed.*

FOLIA ASARI. *Lond. Dub.*

This perennial plant is a native of some places of England, although the dried roots are generally brought from the Levant. It grows in moist and shady situations. It produces only two leaves, which are reniform and very obtuse. The root is fibrous, of a grey-brown colour externally, but white within. Both the roots and leaves have a nauseous, bitter, acrimonious, hot taste; their smell is strong, and not very disagreeable.

In its analysis, it is said by Neumann to agree with ipecacuanha, but it seems to contain, besides its odorous principle, which is probably camphor, a portion of the same acrid principle which has been noticed when speaking of arum. Upon this its virtues depend; and as this principle is not fixed, we find that asarabacca loses much of its activity by decoction and long keeping.

*Medical use.*—Given in substance from half a drachm to a drachm, it evacuates powerfully both upwards and downwards. It is said, that alcoholic tinctures possess both the emetic and cathartic virtues of the plant: that the extract obtained by inspissating these tinctures acts only by vomiting, and with great mildness: that an infusion in water proves cathartic, rarely emetic: that aqueous decoctions made by long boiling, and the watery extract, have no purgative or emetic quality, but prove good diaphoretics, diuretics, and emmenagogues.

We principally use this plant as a sternutatory. The root of asarum is perhaps the strongest of all the vegetable errhines, white hellebore itself not excepted. Snuffed up the nose, in the quantity of a grain or two, it occasions a copious evacuation of mucus, and ptyalism. The leaves are considerably milder, and may be used in the quantity of three, four, or five grains. Geoffroy relates, that after snuffing up a dose of this errhine at night, he has frequently observed the discharge from the nose to continue for three days together, and that he has known a paralysis of the mouth and tongue cured by one dose. He recommends this medicine in stubborn disorders of the head, proceeding from viscid tenacious matter, in palsies, and in soporific distempers.

Aspidium filix mas. *Lond.* *Ed.* Willd. *g.* 1962, *sp.* 94. Smith, *g.* 429, *sp.* 4.

Polypodium filix mas. *Dub.*

Male fern. Male shield fern.

*Off.*—The root.

Radix aspidii filicis maris. *Ed.*

Radix filicis maris. *Dub.*

Radix filicis. *Lond.*

This fern is perennial, flowers in June and July, and is found in great abundance in our woods. The root consists of many egg-shaped knots, closely compressed together, forming a crooked mass of a blackish colour, and covered with brown scales.

When chewed, its taste is somewhat mucilaginous and sweet, and afterwards slightly astringent and bitter. Its smell is also weak.

*Medical use.*—This root was used as an anthelmintic in the days of Dioscorides. It gradually became neglected; but its use was again revived at different times by Madame Nuffer, Herrenschwand, and others, who frequently succeeded in killing and expelling the tænia, both lata and cucurbitina, by the exhibition of secret remedies, of which the fern powder was, or rather was supposed to be, the principal ingredient; for there is much reason to believe, that the active purgatives with which it was always combined, were really the remedies which effected the cure.

The same, or nearly a similar secret, has been bought by different potentates, and published for the benefit of those suffering under this obstinate disease.

The internal solid part of the root only is to be powdered, and the powder should have a reddish colour; and as the dose and exhibition of the remedy must be regulated according to the age, sex, and constitution of the patient, it should always be given under the direction of an experienced practitioner.

Astragalus tragacantha. *Ed. Dub.*

Willd. *g.* 1379, *sp.* 154. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ.*

Astragalus verus. *Lond.*

Tragacanth.

*Off.*—Gum Tragacanth.

Gummi astragali tragacanthæ, *ex variis astragali speciebus. Ed.*

Gummi tragacantha. *Dub.*

Tragacantha. *Lond.*

Gum tragacanth is produced by a very thorny shrub, which grows on the island of Candia, and other places in the Levant; but it is now stated, on the authority of Olivier, that the *Astragalus verus* is the species which furnishes the chief part of the Gum tragacanth of commerce. His words are, "This gummy substance is formed from the month of July to the end of September, on the trunks of several species of

Astragalus, which grow in Natolia, Armenia, Curdistan, and all the north of Persia. Tournefort has described one of these, which also furnishes tragacanth, which he found on Mount Ida in Crete; and La Billardiere has described and figured another which he saw in Syria. The Astragalus, which appears to us the most common, and that from which almost all the Tragacanth of commerce is derived, has not been described by any botanist. It differs essentially from the two species which we have mentioned, in its habits and its flowers." In a note upon the description, which it is unnecessary to insert, he characterises it as "*Astragalus verus*, fruticosus, foliolis villosis, setaceis, subulatis; floribus auxillaribus, aggregatis, luteis." After finishing the description, he continues, "Tragacanth exudes naturally, either from wounds made in the shrub by animals, or from fissures occasioned by the force of the *succus proprius*, during the great heats of summer. According as the juice is more or less abundant, Tragacanth exudes in tortuous filaments, which sometimes assume the form of a small worm, or of a pretty thick worm, elongated, rounded, or compressed, rolled up upon itself, or twisted. The finest and purest Tragacanth assumes this form. It is almost transparent, whitish, or of a yellowish white. It also exudes in large tears, which preserve more or less of the vermicular form. This is more of a reddish colour, and more contaminated with impurities. It sometimes adheres so strongly to the bark, as to bring part of it with it in gathering it. The quantity of tragacanth furnished by Persia is very considerable. Much is consumed in that country in the manufacture of silk, and the preparation of comfits. It is exported to India, Bagdad, and Bussorah. Russia also gets some by the way of Bakou."

Tragacanth is difficultly pulverizable, unless when thoroughly dried, and the mortar heated, or in frost. According to Neumann, it gives nothing over in distillation, either to water or alcohol: alcohol dissolves only about 10 parts of 480, and water the whole. Lewis, however, more accurately observes, that it cannot be properly said to be dissolved; for, put into water, it absorbs a large proportion of that fluid, increasing immensely in volume, and forming with it a soft, but not fluid mucilage; and although it is easily diffused through a larger proportion of water, after standing a day or two, the mucilage subsides again, the supernatant fluid retaining little of the gum.

Besides these remarkable differences from gum-arabic in regard to brittleness, insolubility, and the quantity of water which it thickens, I find that tragacanth is not precipitated by silicized potass, and is precipitated by sulphate of copper and acetate of lead.

In pharmacy it is employed for forming powders into troches, and rendering tough cohesive substances, such as colocynth, pulverizable, by beating them with mucilage of tragacanth, and then drying the mass. For electuaries it is improper, as it renders them slimy on keeping.

ATROPA BELLADONNA. *Ed. Lond. Dub.*

Willd. *g.* 381. *sp.* 2. Smith, *g.* 100, *sp.* 1.—*Pentandria Monogynia.*—Nat. ord. *Solanaceæ.*

Deadly nightshade.

*Off.*—The leaf.

FOLIA ATROPÆ BELLADONNÆ. *Ed.*

FOLIA BELLADONNÆ. *Lond. Dub.*

THE deadly nightshade is a perennial plant, with a herbaceous stem, which is indigenous both in mountainous and woody situations in this country, and often cultivated in gardens. The whole plant is poisonous, and the berries, from their beautiful appearance, have sometimes proved fatal to children. The symptoms excited are, dryness of the mouth, trembling of the tongue, very distressing thirst, difficulty of swallowing, fruitless efforts to vomit, and great anxiety about the præcordia. Delirium then comes on, with gnashing of the teeth, and convulsions. The pupil remains dilated, and is not sensible even to the stimulus of light. The face becomes tumid, and of a dark red colour. The jaws are frequently locked. Inflammation attacks the œsophagus, stomach, and intestines, sometimes extending to the mesentery, lungs, and liver, accompanied with violent pains in the abdomen. The stomach is very insensible to stimulus, and the peristaltic motion of the intestines is destroyed. General relaxation, palsy, especially of the lower extremities, convulsions, vertigo, blindness, coma, and death succeed. The body soon putrifies, swells, and becomes marked with livid spots; blood flows from the nose, mouth, and ears, and the stench is insufferable. On dissection the blood is found to be fluid, the intestines are inflated and inflamed, or eroded and gangrenous. The best method of cure is to excite vomiting as soon as possible, by emetics, and tickling the fauces; to evacuate the bowels by purgatives and glysters; and to give largely, vinegar, honey, milk, and oil. In some children who recovered by this treatment, the delirium was succeeded by a profound sopor, accompanied with subsultus tendinum; the face and hands became pale and cold, and the pulse small, hard, and quick. Their recovery was slow, and the blindness continued a considerable time, but at last went off.

By distillation in the vapour bath, Geoffroy procured from the recent leaves a slightly acrid liquor, and the residuum by destructive distillation yielded carbonate of ammonia.

*Medical use.*—Yet this virulent poison, under proper management, may become an excellent remedy. Besides its narcotic power, it promotes all the excretions; but its exhibition requires the greatest caution; for it is apt, when continued for any length of time, even in small doses, to cause dryness and tension of the throat and neighbouring parts, vertigo, dimness of sight, and even temporary blindness. When any of these symptoms occur, its use must be suspended for some time, and afterwards resumed in smaller doses.

Deadly nightshade has been exhibited,

1. In several febrile diseases; in obstinate intermittents; and in the plague.
2. In inflammations: the gout.
3. In comatose diseases; in palsy, and loss of speech from apoplexy.
4. In spasmodic diseases; in chorea, epilepsy, chincough, hydrophobia, melancholy, and mania.
5. In cachectic affections; in dropsies, and obstinate jaundice.
6. In local diseases; in amaurosis, ophthalmia, in scirrhus, and cancer.

Deadly nightshade is best exhibited in substance, beginning with a very small dose of the powdered leaves or root, such as the fourth or eighth part of a grain for children, and one grain for adults, to be repeated daily, and gradually increased. In hydrophobia, Munch gave the powdered root every second morning, to the extent of from one to five grains to children, and fourteen or fifteen grains to adults.

The watery infusion is also a powerful remedy. One scruple of the dried leaves is infused in ten ounces of warm water, and strained after cooling. At first two ounces of this may be given daily to adults, and gradually increased, until the tension of the throat shews that it would be imprudent to go farther.

The watery extract is not a judicious preparation.

Externally, the powdered leaves are applied as a narcotic to diminish pain, and to cancerous and ill-conditioned sores. From its effect, in dilating the pupil for some time, Professor Reimarus proposed, and tried with success, the dropping a little of the infusion into the eye, a few hours before performing the extraction for the cataract, with a view of facilitating the operation. It has since been used in other diseases of the eye.

AVENA SATIVA. *Ed.*

Willd. *g.* 142, *sp.* 13. *Triandria Digynia.*—Nat. ord. *Gramina.*

Oats.

*Off.*—The husked seed; groats and the meal.

*a)* SEMINA AVENÆ SATIVÆ. Semina decorticata. *Ed.*
SEMINA AVENÆ. *Lond.*

*b)* FARINA AVENÆ SATIVÆ ex seminibus. *Ed.*

THIS is a well-known annual plant, which is very generally cultivated in northern countries, and in many places furnishes the principal subsistence of the people. When simply freed from the husks, this grain gets the name of groats, but it is more frequently ground into meal. Groats are made use of in broths. Oatmeal is baked with salt and water into cakes, or, with the same additions, is boiled to form porridge, two very important articles of food in this country. An infusion of the husks in water, allowed to remain till it becomes acidulous, is boiled down to jelly, which is called sowins. In all these forms it is nutritious, and easy of digestion.

Vauquelin found in the ashes of oats, phosphate of lime and silica.

*Med. use.*—Gruels or decoctions, either of groats or oatmeal, either plain or acidified, or sweetened, form an excellent drink in febrile diseases, diarrhœa, dysentery, &c. and from their demulcent properties, prove useful in inflammatory disorders, coughs, hoarseness, roughness, and exulcerations of the fauces. Porridge is also frequently applied to phlegmonous swellings, to promote their suppuration.

BARYTÆ CARBONAS. *Ed.*

Carbonate of baryta, Barytes. Heavy spar.

CARBONATED BARYTA is rarely found in nature. It was first discovered by Dr Withering, and hence Mr Werner gave it the name of Witherite. Its colour is greyish-white, sometimes inclining to milk white, and sometimes with a slight tinge of yellow, from a mixture of iron, seldom greenish, often invested with a red ochrey crust. It is found in solid masses, sometimes filling an entire vein, sometimes interpersed with sulphated baryta, frequently rounded, or affecting that form, seldom crystallized. Texture fibrous; fracture conchoidal; fragments, long splinters; specific gravity 4.3 to 4.338. Although it has no sensible taste, it is poisonous. In medicine it is only used for preparing the muriate of baryta. It is found in Lancashire, Cumberland, Scotland, and Sweden, but is not common.

BARYTÆ SULPHAS. *Ed.*
Sulphate of baryta. Ponderous spar.

THIS salt is found in great abundance. The foliated is in general the purest. Its specific gravity is from 4.4 to 4.865. It is insoluble in water. It is soluble in boiling concentrated sulphuric acid. It decrepitates when suddenly heated. By being formed into a thin cake with flour and water, and being afterwards heated to redness, it becomes phosphorescent. Heated to redness with charcoal, it is converted into a sulphuret, and it may be decomposed by the carbonates of potass and of soda.

BITUMEN PETROLEUM. *Ed.*
PETROLEUM. *Lond.*
PETROLEUM BARBADENSE, S. S. *Bitumen Petroleum. Dub.*
Rock oil. Barbadoes tar.

BITUMEN is now employed as the generic name for several inflammable bodies of different degrees of consistency, from perfect fluidity to that of a brittle but very fusible solid, and of little specific gravity. They are insoluble in alcohol or in water, combine with essential oils and sulphur, decompose only a small proportion of nitrate of potass by deflagration, and on inflammation leave little or no residuum. Bitumen in its various states is found in various parts of the world, in the Tauride, at Burmah, Zante, Barbadoes and Trinidad.

*Sp.* 1. NAPHTHA. It is nearly as colourless, transparent, and fluid as water. Specific gravity 0.729 to 0.847, of a highly penetrating, yet not disagreeable smell, somewhat like that of rectified oil of amber, very volatile, and remaining fluid at zero Fahrenheit.

*Sp.* 2. PETROLEUM. Not so fluid, transparent, or colourless, as the former; smell less pleasant. Specific gravity 0.878.

*Sp.* 3. MINERAL TAR. Viscid; of a dark colour; smell sometimes strong, but often faint. Specific gravity 1.1.

*Sp.* 4. MINERAL PITCH.—Maltha. Brittle in cold weather; of a dark colour; opaque. Specific gravity probably 1.07.

*Sp.* 5. ASPHALTUM. Very brittle; fracture conchoidal; glassy lustre; no smell unless when melted or heated. Specific gravity 1.07 to 1.65. Fusible and inflammable.

According to Mr Kirwan and Mr Hatchett, the first species, by exposure to the air, and gradual decomposition, passes successively through the intermediate states, till at last it is converted into asphaltum. When partially decomposed,

the remaining naphtha may be separated by distillation from the superabundant charcoal.

The first species is very rare. It is found in Persia and in the Dutchy of Modena. The second is the officinal article, and comes from Barbadoes and other tropical islands.

*Medical use.*—If the finer kinds could be procured genuine, they seem to deserve some notice. They are more agreeable than the oil of amber, and milder than that of turpentine, of the virtues of both of which they participate. They are principally recommended by authors for external purposes, against pains and aches, in paralytic complaints, and for preventing chilblains. For these intentions, some of the more common mineral oils have been made use of with good success. An oil extracted from a kind of stone coal has been extolled among the common people, under the name of British oil, for rheumatic pains, &c.; even this is often counterfeited by a small portion of oil of amber added to the common expressed oils.

The Barbadoes tar is found in several of the West-India islands, where it is highly esteemed by the inhabitants as a sudorific and in disorders of the breast and lungs; though in cases of this kind, attended with inflammation, it is certainly improper; they likewise apply it externally as a discutient, and for preventing paralytic disorders.

Boletus igniarius. *Ed.*

*Cryptogamia, Fungi.*—Nat. ord. *Fungi.*

Female agaric, or agaric of the oak, called, from its being very easily inflammable, Touchwood or Spunk.

This fungus is indigenous, and is frequently met with on different kinds of trees, especially the cherry and plumb. The medullary part, beaten soft, and applied externally, has been much celebrated as a styptic, and said to restrain not only venous but arterial hæmorrhagies, without the use of ligatures. It does not appear, however, to have any real styptic power, or to act otherwise than dry lint, sponge, or any other soft, fungous application. It is best when gathered in August or September.

It has been analysed by Bouillon Lagrange, who found it to contain, 1. An extractive matter soluble in water, sulphate of lime, and muriate of potass. 2. The residuum incinerated gave phosphates of lime, magnesia, and iron. 3. Alcohol extracted very little resin. The alkalies also indicated the presence of an animal matter, but in less quantity than in the boletus agaricus, which also differed in containing a free acid and much resin. But it probably consists chiefly of that

highly azotized principle discovered by Braconnot, and called *Fungin.*

Bonplandia trifoliata. *Ed.*
Cusparia febrifuga *Lond*
Willd. *g. sp. Pentandria Monogynia.* Ord. naturalis, *Quassiæ*, Jussieu.

*Off.*—The bark, called Angustura bark.
Cortex bonplandiæ trifoliatæ. *Ed.*
Cortex angusturæ. *Dub.*
Cortex cuspariæ. *Lond.*

The natural history of this bark was long but imperfectly known. The first portion of it was imported from Dominica in July 1788, with an account, "that it had been found superior "to Peruvian bark in the cure of fevers." Subsequent importations from the Spanish West Indies, either directly, or through the medium of Spain, rendered it probable that it was the produce of South America. This has been fully established by the late travels of Humboldt in that country. He gave to Willdenow a dried specimen of the tree of which it is the bark, and that eminent botanist discovered it to be a new genus, to which he gave the name of Bonplandia, in honour of the botanical companion of Humboldt's travels.

The London college, however, give this tree the name of Cusparia Febrifuga, derived from *Cuspa*, the native appellation of the tree; but this name must be abandoned, for although it was inserted by Humboldt in the chart belonging to his geography of plants, that of Bonplandia Trifoliata is adopted by him in his Plantæ Æquinoctiales. The name Angustura bark is derived from the Spanish denomination, *cascarilla*, or *corteza del Angostura*, which is the vulgar name of the town of St Thomas, near the Straits of the Orinoco, where it forms a considerable article of commerce.

The appearance of the bark varies, according as it has been taken from larger or smaller branches. It is only one or two lines in thickness, and is sometimes cracked externally. The outer surface is more or less wrinkled, and of a greyish colour, and the inner surface is of a dull brown. The bark of the younger branches is of a fine green colour, dotted with greyish tubercles. Its substance is of a yellowish-brown colour. Its fracture is short and resinous. Its taste is intensely bitter, and slightly aromatic, leaving a strong sense of heat and pungency in the throat and fauces The odour is peculiar. The powder is yellow.

According to the experiments related by Mr Brande, from 3840 parts of angustura, there were extracted by alcohol, 144

of resin, and 300 of an acrid unctuous substance; the residuum yielded to water 1500 of dry gummy extract. Treated first with water, it gave 2110 grains of a clear brown extract, bitter, but not acrid, and afterwards 161 of a resin of a light brown colour, and extremely acrid. By distillation it gave 26 of essential oil. The tincture is of a deep yellow colour, reddens infusion of turnsole, and becomes turbid and white on admixture with water. By repeated filtration a brownish resin is separated, and the transparent fluid has a pale yellow colour. I find that it is not precipitated by solution of gelatin, but by infusion of galls. It therefore does not contain tannin, but cinchonin, and it has the peculiar property of acquiring a deep red colour with red sulphate of iron, and depositing a purplish slate-coloured precipitate, remarkably different from what I have seen any other substance produce. Vauquelin says this precipitate is yellow; but in every other respect his analysis confirms mine. As it appears that the angustura of commerce is of different kinds, and often mixed, these experiments require to be repeated with genuine specimens.

Dr Rambach of Hamburgh first observed poisonous effects from some angustura bark, and his observations have been fully confirmed by other accidents and by experiments on animals. The Austrian Government, on this account, ordered all the angustura bark in the kingdom to be destroyed, and interdicted its future importation; and other states have followed its example. As it, however, still has a place in the British Pharmacopœias, it becomes necessary to point out fully the means of distinguishing the genuine from the spurious sort, which Planche has called *Angustura pseudo-ferruginæa.*

| *Genuine.* | *Spurious.* |
|---|---|
| The produce of the *Bonplandia trifoliata* of Humboldt, a native of South America. | Unknown. Said by some to come from the East Indies; and one kind suspected by *Planche*, but contrary to probability, to be got from a variety of the *Cinchona magnifolia* of Bonpland. |
| Size from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch broad; 2, 3, or 4 inches long; half a line thick. Outer surface uniform greyish-white, as if covered with an uneven mealy coat, which is easily removed, and exposes a brown surface beneath. Inner surface greyish-yellow, or light-brown. Texture fine; very brittle. Fracture even; | Size generally of greater breadth than length; two lines thick. Outer surface covered with a web of distinct small white warts, not easily removed, or with an uniform rust-coloured lichen-like covering. Inner surface, dirty yellowish-white, or grey, or most commonly black, without visible fibres |

| *Genuine.* | *Spurious.* |
| --- | --- |
| much darker and browner than the inner surface ; somewhat shining, and evidently resinous. | Texture coarse ; very brittle. Fracture even; partly, white, or yellowish-white, or even clear brownish ; not shining and resinous, but more mealy, and partly exhibiting two distinct layers. |
| Smell aromatic ; somewhat nauseous. | Smell resembling somewhat that of the genuine kind. |
| Taste aromatic bitter, but not at all disgustingly bitter, or astringent, succeeded in some degree by an aromatic flavour like mace. | Taste in the highest degree disgustingly bitter; very durable, and not at all aromatic, or astringent. |
| Bark, on being chewed, becomes dark-brown yellow. Powder, when fresh, yellow, like good rhubarb, becoming paler by keeping, with a more aromatic smell than the bark. | Bark on being chewed becomes paler. Powder clearer yellow. |
| Concentrated infusion clear, of a fine reddish-brown or orange colour, and a bitter, only slightly acrid taste. | Concentrated infusion, not so clear, more of a dirty-brown colour, and of a most disgustingly bitter taste. |
| Diluted with water, its colour becomes yellow. | When diluted, it does not become yellow. |
| On the addition of an alkaline carbonate, it is changed to dark red, and after some time deposites a clear citron yellow, somewhat flocculent precipitate. | On the addition of an alkaline carbonate, it becomes greenish, and deposites a flocculent greyish-yellow precipitate, and the supernatant liquor becomes gradually dark-brown, beginning at the surface. |
| A solution of persulphate or permuriate of iron imparts to it a higher red colour, and after some time throws down a rose-coloured precipitate. | A solution of persulphate or permuriate of iron imparts to it a dark green colour, and soon throws down a copious sattin black precipitate, verging somewhat to ash-grey, which is perfectly redissolved by nitric acid, and forms an olive solution. |
| Is not rendered turbid by solution of gelatine. | Is not rendered turbid by solution of gelatine. |
| Saturated decoction of a fine red-brown, on cooling becomes turbid, and deposites a deep-yellow powder. | Saturated decoction, brownish-yellow, and, on cooling, deposites a very copious grey-brown precipitate. |
| Saturated tincture, dark-red-brown, becoming very turbid by the addition of distilled water, and depositing a clear yellow resin. | Saturated tincture, much paler ; and, on the addition of distilled water, only gets a pale-yellowish opaline appearance, without becoming red, or depositing any precipitate. |

The spurious angustura belongs to the same class of poisons as the Faba St Ignatii, upas tieuté, &c.

*Med. use.*—As an aromatic bitter, it acts as a tonic and stimulant of the organs of digestion. It increases the appetite for food, removes flatulence and acidity arising from dyspepsia, and is a very effectual remedy in diarrhœa proceeding from weakness of the bowels, and in dysentery; and it possesses the singular advantage of not oppressing the stomach, as cinchona is apt to do. It does not cure intermittents.

It is exhibited,

1. In powder, in doses of from 5 to 20 grains, either alone or with rhubarb, magnesia, or carbonate of lime.
2. In infusion: the infusion of one drachm in four ounces of water may be used daily.
3. In tincture: one or two drachms in dyspepsia.
4. In watery extract. Humboldt informs us, that the Catalonian Capuchins, who possess the missions of Carony, prepare with great care an extract of this bark, which they distribute to the convents of Catalonia.

BORAX. *See* SODÆ SUB-BORAS.

BUBON GALBANUM. *Ed. Dub. Lond.*

Willd. *g.* 546, *sp.* 2.—*Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

*Off.*—The gum-resin called Galbanum.
GUMMI RESINA BUBONIS GALBANI. *Ed.*
GALBANUM; gummi resina. *Dub.*
GUMMI RESINA GALBANI. *Lond.*

THIS plant is perennial, and grows in Africa. It abounds with a milky juice, which sometimes exudes from the joints of the old plants, but is more frequently obtained by cutting them across some inches above the root. The juice which flows from the wound soon hardens, and is the galbanum which is brought to us from Syria and the Levant.

The best sort of galbanum consists of pale-coloured pieces, about the size of a hazel nut, which, on being broken, appear to be composed of clear white tears, of a bitterish acrid taste and a strong peculiar smell. But it most commonly occurs in agglutinated masses, composed of yellowish or reddish and clear white tears, which may be easily torn asunder, of the consistence of firm wax, softening by heat, and becoming brittle by cold, and mixed with seeds and leaves. What is mixed with sand, earth, and other impurities, and is of a brown

or blackish colour, interspersed with no white grains, of a weak smell, and of a consistence always soft, is bad.

Galbanum is almost entirely diffusible in water, but the solution is milky; nor does wine or vinegar dissolve it perfectly. It is not fusible, but furnishes a considerable proportion of essential oil when distilled with water. Neumann obtained from a pound of galbanum by distillation with water six drachms of oil, besides what remained dissolved in the water. The watery extract amounted to about three ounces. It was somewhat nauseous, but could not have been recognised as a preparation of galbanum. From the same quantity alcohol extracted upwards of nine ounces and a half of a hard, brittle, insipid, inodorous substance (resin ?)

*Medical use.*—Galbanum agrees in virtue with gum ammoniacum; but is generally accounted less proper in asthmas, and more so in hysterical complaints. It is exhibited in the form of pills or emulsion, to the extent of about a drachm. Applied externally, it is supposed to resolve and discuss tumours, and to promote suppuration.

BUTEA FRONDOSA. *Dub.*

Willd. *sp. plant. t.* 3, *p.* 917. *Diadelphia Monogynia. Roxburgh's Coromandel Plants, vol.* 1, *p.* 22. *t.* 21. *Plaso Rheed. Malab.* 6. *p.* 29. *tab.* 16, 17. *The* Maduga *of the Telingas.*

Leafy Butea.

*Officinal.*—Kino.

KINO. *Dub.*

I HAVE introduced this article, because the Dublin College have quoted it as furnishing the kino of the shops, though certainly erroneously; for not only is it well known that the greatest part of the kino of the shops is the product of the eucalyptus resinifera of Botany Bay, but Dr Roxburgh, whom they quote as their authority, distinctly mentions that the concrete juice of the maduga differs from kino. To prevent the error from being repeated or propagated, and still more, as the article seems worthy of further examination, I shall quote his own words.

" This is a middle-sized, or rather a large tree, not common in the low lands of this coast, but very common among the mountains; casts its leaves during the cold season, which come out again with the flowers about the months of March or April; seed ripe in June and July.

" From natural fissures and wounds made in the bark of this tree during the hot season, there issues a most beautiful red juice, which soon hardens into a ruby-coloured, brittle,

astringent gum; but it soon loses its beautiful colour if exposed to the air. To preserve the colour, the gum must be gathered as soon as it becomes hard, and closely corked up in a bottle. This gum held in the flame of a candle swells, and burns away slowly, without smell or the least flame, into a coal, and then into fine light ashes; held in the mouth it soon dissolves; it tastes strongly, but simply astringent; heat does not soften it, but rather renders it more brittle. Pure water dissolves it perfectly, and the solution is of a deep, clear, red colour. It is in a great measure soluble in spirits, but the solution is paler, and a little turbid; the watery solution also becomes turbid when spirit is added, and the spiritous more clear by the addition of water: diluted vitriolic acid renders both solutions turbid; mild caustic (?) vegetable alkali changes the colour of the watery solution to a clear, deep, fiery blood red; the spiritous it also deepens, but in a less degree; *sal martis* changes the watery solution into a good durable ink."

"These are, I think, proofs that it contains a very small proportion of resin; in which *it differs from the gum resin called kino, or gummi rubrum astringens Gambiense*, which the Edinburgh College has taken into their materia medica. I have used the recent gum in making my experiments, which may make some difference; but as this can be most perfectly dissolved in a watery menstruum, it may prove of use, where a spiritous solution of kino (being the most complete) cannot be properly admitted; consequently it may prove a valuable acquisition."

The butea superba, a very large twining shrub, yields a similar juice.

Calx, recens usta. *Dub. Ed.*
Quicklime recently burnt.

The properties of lime have been already enumerated. It is scarcely found in nature uncombined, but is easily prepared from any of its carbonates, either mineral or animal, by the action of fire, which first expels the water, then destroys any animal matters which may be present, and, lastly, expels the carbonic acid. This process is improperly termed the burning of lime. The product is lime, or, as it is commonly called, quicklime.

If about half its weight of water be poured upon lime, a great increase of temperature takes place, steam is produced, and the lime crumbles down into a dry powder, somewhat increased in weight by the presence of part of the water, which has been solidified by the lime: and to the caloric of fluidity, which is expelled during the conversion of the water into a

solid, the great increase of the temperature is owing. Lime in this state is said to be slacked. If more water be poured upon slacked lime, there is no new evolution of caloric; but if the water amount to 700 times the weight of the lime, the lime is completely dissolved. The solution is termed Lime-water.

As lime quickly attracts moisture and carbonic acid from the atmosphere, it should be always recently prepared; and it should be preserved in very close bottles. Lime should not effervesce with acids, and should be entirely soluble in water.

*Medical use.*—On the living body lime acts as an escharotic, and as such it was formerly applied to ill-conditioned and obstinate sores. Dissolved in water, it is sometimes given internally as a tonic or astringent in scrofula and various fluxes, and formerly it enjoyed considerable reputation as a lithontriptic. It is extremely useful in removing the scabby crusts in tinea capitis.

CARBONAS CALCIS.
Carbonate of lime.

Carbonate of lime is obtained from both the mineral and animal kingdoms. It is the most common of all minerals, is found under a great variety of forms, and has various names, as chalk, limestone, marble, spar. In form it is either amorphous, stalactical, or crystallised. When amorphous, its texture is either foliated, striated, granular, or earthy. The primitive form of its crystals is a rhomboidal parallelopiped. Hardness, lustre, and transparency, various: when transparent, it causes double refraction; specific gravity from 2.315 to 2.78; colour, when pure, white; effervesces violently with muriatic acid, and dissolves in it entirely, or nearly so, forming a colourless solution.

The officinal varieties of mineral carbonate of lime are,

*a)* CRETA ALBA, Carbonas calcis mollior. *Ed.*
CRETA, Carbonas calcis friabilis. *Lond.*
CRETA, Carbonas calcis. *Dub.*
Soft carbonate of lime. Chalk.

*b)* MARMOR ALBUM, Carbonas calcis durior. *Ed.*
LAPIS CALCAREUS, Carbonas calcis dura. *Lond.*
Indurated carbonate of lime. Marble.

They contain about 45 parts of carbonic acid, and 55 of lime.

In medicine it is given to correct acidity in the primæ viæ,

especially when accompanied with looseness. Powdered chalk has been externally applied with success to scalds and burns.

Carbonate of lime occurs in the animal kingdom in the shells and rudiments of shells of some of the crustaceous insects. Of these some are still officinal, *Crabs claws*, *Crabs stones*, vulgarly called crabs eyes, and *Oyster shells*.

*c)* CHELÆ CANCRORUM ex cancro paguro. *Ed.*
CHELÆ CANCRORUM. *Dub.*
Crab claws from the black clawed-crab.

The species of crab which furnishes this article inhabits the North Sea. Its claws are yellow, tipt with black.

They consist of carbonate of lime, combined with a little phosphate of lime and gelatine. The quantity of the two last is too small, and their action on the human body too inconsiderable, to make any considerable difference in medical properties, between these concretions and soft carbonate of lime, as it occurs in the mineral kingdom.

*d)* LAPILLI CANCRORUM ex cancro astacho. *Ed.*
CALCULI CANCRORUM, Oculi dicti. *Dub.*

CRABS stones are generally about the size of peas, or larger; somewhat hemispherical in their shape, and laminated in their texture; of a white colour, but sometimes reddish or bluish.

These concretions are found in the stomach of the craw-fish, one on each side, at the time when the animal changes its shell, and renews the inner membrane of the stomach, which commonly happens in the month of August. The stones afterwards gradually disappear, and none are found after the new shell has acquired its full degree of firmness. They therefore seem to furnish the materials for the induration of the new shell. They are brought in great numbers from Poland and Russia, especially from the province of Astracan, where the craw-fish are either bruised with wooden mallets, or laid up in heaps to putrefy, when the flesh is washed away with water, and the stones picked out.

Crab stones are said by most writers on the materia medica to be frequently counterfeited with tobacco-pipe clay, or compositions of chalk with mucilaginous substances. This piece of fraud, if really practised, may be very easily discovered: the counterfeits wanting the leafy texture, which is observed upon breaking the genuine; more readily imbibing water; adhering to the tongue; and dissolving in vinegar, or the

stronger acids, diluted with water, either entirely or not at all, or by piece-meal; whilst the true crab stones, digested in these liquors, become soft and transparent, their original form remaining the same, as the organization of the gelatine is not altered by the acid.

*e)* Testæ ex ostrea eduli. *Lond.*
Oyster shells.

The oyster is a very nutritious article of diet, and in some diseases not only admissible, but even advantageous. Their shells, which are officinal, are composed, like all other mother-of-pearl shells, of alternate layers of carbonate of lime, and a thin membranous substance, which exactly resembles coagulated albumen in its properties. By burning, this membrane is destroyed, and the shells are converted into lime, which, although very pure, possesses no advantage over that of the mineral kingdom.

Camphora ex lauro camphora. *Ed.*
Camphora, concretum sui generis distillatione paratum. *L.*
Camphora, resina. *Dub.*
Camphor.

The camphor laurel grows in great abundance, and to a very considerable size, in the forests of Japan. It is not uncommon in greenhouses in England. Every part of the tree smells strongly of camphor, which is obtained from the trunk, branches, and root, by distillation. They are cut down into small pieces, and put into a still, with a proportion of water. After the water has been kept boiling forty-eight hours, the camphor is found adhering to the straw with which the head of the still is lined. In this state it is imported by the Dutch, and is called crude camphor. It is very impure, consisting of small brownish or dirty grey grains, mixed with straw, wood, hair, and other impurities. From these it is purified, in Holland, by a second sublimation in glass vessels; being previously mixed with quicklime, to combine with and prevent any empyreumatic oil with which it may be contaminated from subliming, while the camphor concretes in the upper part of the vessel into cakes, convex on the one side, and concave on the other, about two or three inches thick, thinner at the edges, and generally perforated in the middle.

Pure camphor is lighter than water, very white, pellucid, somewhat unctuous to the touch, brittle, yet tough and elastic, so as to be scarcely pulverizable; shining in its fracture, and crystalline in its texture; of a bitterish, aromatic, pungent taste, yet accompanied with a sense of coolness, of a

strong and very penetrating smell; very volatile, inflammable, burning entirely away, without leaving any coal or ashes; capable of combining with the resins and balsams, soluble in alcohol, ether, fixed and volatile oils, and the concentrated sulphuric, nitric, muriatic, fluoric, and acetic acids; separable from these alcoholic and acid solutions by water; insoluble in water, alkalis, and the weaker acids; decomposed by heat, when mixed with alumina, into an essential oil and charcoal; and by treating it with a sufficient quantity of nitric acid, forming a portion of camphoric acid; and by treating it with sulphuric acid, forming artificial tannin.

But the production of camphor is not confined to the laurus camphora, although it furnishes almost all the camphor of commerce; it is found in very great purity in interstices among the woody fibres of an unknown tree in Borneo; it is also contained in the roots of the laurus cinnamomum and cassia, alpinia galanga, amomum zedoaria, &c.; in the seeds of the amomum cardamomum, piper cubeba, &c.; and in many indigenous plants, as in the thymus serpyllum and vulgaris, juniperus communis, rosmarinus officinalis, salvia officinalis, mentha piperita, &c. and may be separated from the essential oils of rosemary, lavender, marjoram, and sage. An artificial camphor, differing from common camphor, in not being soluble in weak nitric acid, nor being precipitated by water from its solution in strong nitric acid, may also be prepared, by directing a stream of muriatic acid gas into oil of turpentine. Camphor is now universally considered to be a peculiar principle of vegetables, and not a resin, as incorrectly stated by the Dublin College.

*Medical use.*—Camphor is a very active substance, when taken into the stomach. It increases the heat of the body considerably, and gives a tendency to diaphoresis, but without quickening the pulse. At first it raises the spirits, but produces a subsequent depression, and facilitates voluntary motion. In excessive doses it causes syncope, anxiety, retchings, convulsions and delirium. These violent effects of camphor are most effectually counteracted by opium.

In a morbid state of the body, camphor allays inordinate actions. When the pulse is hard and contracted, it renders it fuller and softer. It removes spasms, and flitting pains arising from spasms; and in delirium, when opium fails of procuring sleep, camphor will often succeed. It is also said to correct the bad effects of opium, mezereon, cantharides, and the drastic purgatives and diuretics.

The most general indication for the use of camphor is the

languor or oppression of the *vis vitæ*. It may therefore be given with advantage,

1. In all febrile diseases of the typhoid kind, especially when attended with delirium.
2. In inflammations with typhoid fever, as in some cases of peripneumonia and rheumatism.
3. In eruptive diseases, to favour the eruption, or to bring it back to the skin, if from any cause it has suddenly receded, as in small-pox, measles, &c.
4. In many spasmodic diseases, especially mania, melancholy, epilepsy, hysteria, chorea, hiccough, &c.
5. In indolent local inflammations, not depending upon an internal cause, to excite action in that part.

As, from its great lightness, it is apt to swim upon the contents of the stomach, and to occasion pain at its upper orifice, it is necessary that it be always exhibited in a state of minute division. In order to reduce it to powder, it must be previously moistened with a little alcohol. It may then be given,

1. In powder, with sugar, magnesia, and nitrate of potass.
2. In pills, with the fetid gums and mucilage.
3. In solution, in alcohol, oil, or acetic acid.
4. Suspended in the form of an emulsion, by means of mucilage, sugar, yolk of egg, almonds, vinegar, &c.

Internally, it may be given in small doses, of from one to five grains, repeated at short intervals, as its effects are very transient; or in large doses, of 20 grains and upwards.

Canella alba. *Lond. Ed. Dub.*

Willd. *g.* 942, *sp.* 1.—*Dodecandria Monogynia.*—Nat. ord. *Oleraceæ.*

Canella alba.

*Off.*—The bark.

Cortex canellæ albæ. *Ed.*

Cortex canellæ. *Lond.*

Canella alba. *Dub.*

The canella alba is a tall tree, which is very common in Jamaica, and other West-India islands.

The canella is the interior bark, freed from the epidermis, which is thin and rough, and dried in the shade. There are two sorts of canella in the shops, differing from each other in the length and thickness of the quills; they are both the bark of the same tree, the thicker being taken from the trunk, and the thinner from the branches.

It was introduced into Europe, according to Clusius, in

1605, and is brought to us rolled up in long quills, or flat pieces, thicker than cinnamon, and both outwardly and inwardly of a whitish colour, slightly inclining to yellow. It is a warm pungent aromatic, and in distillation with water it yields a large proportion of a very active volatile oil, of a yellow or rather reddish colour, and of a sweet odour, approaching to that of cinnamon. It must not be confounded with the bark of the Wintera aromatica.

*Medical use.*—Canella alba is sometimes employed where a warm stimulant to the stomach is necessary. In America it is considered to be a powerful antiscorbutic. It is also added as a corrigent to other medicines.

CANTHARIS VESICATORIA. *Ed.*
LYTTA VESICATORIA. *Lond.*
MELOE VESICATORIUS. *Dub.*
*Insecta Cleoptera, Vesicantia. Syst. Nat. Gmelin, g.* 2013.
Spanish fly. Blistering fly.

*Off.*—The insect.
LYTTA. *Lond.*
CANTHARIS VESICATORIA. *Ed.*
CANTHARIS. *Dub.*

These insects have a longish, green, and gold-shining body, with flexible green-striped elytera, which cover the whole back of the body, and conceal brown membranous wings. On their head they have two black articulated feelers. They are found on the fraxinus, sambucus, salix, ligustrum, &c. in Spain, Italy, France, and Germany. The largest come from Italy, but the Spanish cantharides are preferred. They are gathered by shaking the trees on which they are, and catching them on a cloth spread beneath it. They are then killed by the fumes of vinegar, and dried carefully in a stove. The melolontha vitis is sometimes found mixed in considerable numbers with the cantharides. They are easily distinguished by their almost square body; and as they do not stimulate the skin, they should be picked out before the cantharides are powdered. In the East Indies the *Meloë trianthema* is used as a substitute.

The analysis of cantharides is still imperfect. Neumann got from 1920 grains, 920 watery, and afterwards 28 alcoholic extract; and inversely, 400 alcoholic, and 192 watery. Lewis ascertained that their active constituent is entirely soluble, both in water and in alcohol; for extracts made with each of these solvents blistered, as far as could be judged, equally, and as effectually as cantharides in substance. Both

the residua were inactive. Thouvenel considered the vesicating power to reside in a green matter of an oily nature. Beaupoil in two substances, one yellow and the other black, both soluble in water, but separable by alcohol. Lastly, Robiquet, in a very detailed analysis, says, that neither of these three principles blisters of itself; but that this property resides essentially in a particular white crystalline substance, soluble in warm alcohol, separating as it cools, in small scaly crystals, soluble in oils, and insoluble in water. He also found free acetic acid, phosphate of magnesia, a reddish-yellow oil insoluble in alcohol, and, lastly, uric acid.

*Medical use.*—Cantharides have a peculiar nauseous smell, and an extremely acrid burning taste. Taken internally, they often occasion a discharge of blood by urine, with exquisite pain. If the dose be considerable, they seem to inflame and ulcerate the whole intestinal canal; the stools become mucous and purulent; the breath fetid and cadaverous; intense pains are felt in the lower belly; the patient faints, grows giddy, delirious, and dies. Applied to the skin, they first inflame, and afterwards excoriate the part, raising a more perfect blister than any of the acrid vegetables, and occasioning a more plentiful discharge of serum; but even the external application of cantharides is often followed by a strangury, accompanied with thirst and feverish heat.

The inconveniences arising from the use of cantharides, whether taken internally, or applied externally, are best obviated by drinking plentifully of bland emollient liquids, such as milk, emulsions, &c. The specific property of counteracting cantharides ascribed to camphor has no foundation.

The internal use of cantharides is at all times doubtful, and requires the most prudent management. They have, however, been sometimes employed with success in dropsy, and in diseases of the urinary organs, arising from debility, especially gleet and leucorrhœa. They are given in substance, in very small doses, or in tincture.

Applied externally, they are one of our best and most powerful remedies. By proper management, they may be regulated so as to act as a gentle stimulus, as a rubefacient, or as a blister.

Blisters are applied,

1. To increase the activity of the system in general, by means of their irritation;
2. To increase the activity of a particular organ;
3. To diminish morbid action in particular organs, by means of the irritation which they excite in the parts to which they are applied.

They may be employed with advantage in almost all diseases accompanied with typhus fever, especially if any important viscus, as the brains, lungs, or liver, be at the same time particularly affected. In these cases, the blisters cannot be applied to the diseased organs themselves, but as near them as may be convenient. When we wish to excite action in any organ, the blisters are, if possible, applied directly to the diseased organ.

CAPSICUM ANNUUM. *Ed. Dub. Lond.*
Willd. *g.* 384, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ.*
Cockspur pepper.

*Off.*—The fruit or berry.
FRUCTUS CAPSICI ANNUI. *Ed.*
FRUCTUS CAPSICI. *Dub.*
BACCÆ CAPSICI. *Lond.*

THIS is an annual plant, a native of South America, cultivated in large quantities in our West-India islands, and even frequently in our gardens, for the beauty of its pods.

The pods of this species are long, pointed, and pendulous, at first of a green colour, and, when ripe, of a bright orange red. They are filled with a dry loose pulp, and contain many small, flat, kidney-shaped seeds. The taste of Capsicum is extremely pungent and acrimonious, setting the mouth, as it were, on fire.

The principle on which its pungency depends, I find, is soluble in water and in alcohol, is not volatile, reddens infusions of turnsole, and is precipitated by infusion of galls, nitrate of mercury, muriate of mercury, nitrate of silver, sulphate of copper, sulphate of zinc, red sulphate of iron, (but the precipitate is neither blue nor green,) ammonia, carbonate of potass, and alum, but not by sulphuric, nitric, or muriatic acid, or silicized potass.

Cayenne pepper is an indiscriminate mixture of the powder of the dried pods of many species of capsicum, but especially of the *capsicum frustescens*, or bird pepper, which is the hottest of all. Cayenne pepper, as it comes to us in powder from the West Indies, changes infusion of turnsole to a beautiful green, probably owing to the muriate of soda, which is always added to it, and to red oxide of lead, with which it is said to be adulterated.

*Medical use.*—These peppers have been chiefly used as a condiment. They prevent flatulence from vegetable food, and have a warm and kindly effect on the stomach, possessing all

the virtues of the oriental spices, without, according to Dr Wright, producing those complaints in the head which the latter are apt to occasion. An abuse of them, however, is supposed to occasion visceral obstructions, especially of the liver. In the practice of medicine, they constitute one of the simplest and strongest stimulants which can be introduced into the stomach; their action not being followed by any narcotic effects. Dr Wright says, that in dropsical and other complaints, where chalybeates are indicated, a minute portion of powdered capsicum forms an excellent addition; and he recommends its use in lethargic affections. It has also been successfully employed as a gargle in cynanche maligna, when it has resisted the use of cinchona, wine, and the other remedies commonly employed. Coma and delirium are commonly attendants of tropical fevers; and in such cases, cataplasms of capsicum have a speedy and happy effect. They redden the parts, but seldom blister, unless when kept on too long. In ophthalmia from relaxation, the diluted juice of capsicum is a sovereign remedy. Dr Adair gave in cachexia Africana six or eight grains for a dose, made into pills; or he prepared a tincture, by digesting half an ounce of the pepper in a pound of alcohol, the dose of which was one or two drachms diluted with water.

CARDAMINE PRATENSIS. *Ed. Dub. Lond.*
Willd. *g.* 1257, *sp.* 19. Smith, *Flor. Brit. g.* 304. *sp.* 4. *Tetradynamia Siliquosa.*—Nat. ord. *Siliquosæ.*
Meadow ladies smock. Cuckow flower.

*Off.*—The flowers.
FLORES CARDAMINES. *Lond.*
FLOS CARDAMINES. *Dub.*
FLORES CARDAMINES PRATENSIS. *Ed.*

LADIES SMOCK is a perennial plant, which grows in meadow grounds, and produces purplish flowers in the spring. In its sensible qualities it resembles the *sisymbrium nasturtium.*

*Medical use.*—Long ago it was employed as a diuretic; and it has been again introduced in nervous diseases, as epilepsy, hysteria, chorea, asthma, &c. A drachm or two of the powder is given twice or thrice a-day. It has little sensible operation, except that it sometimes acts as a diaphoretic.

CARUM CARUI. *Ed. Dub. Lond.*
Willd. *g.* 561, *sp.* 1.—Smith, *Flor. Brit. g.* 152, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*
Common caraway.

*Officinal.* The seeds.
SEMINA CARUI. *Dub. Lond.*
SEMINA CARI CARUI. *Ed.*

CARAWAY is a biennial umbelliferous plant, cultivated in our gardens, both for culinary and medicinal use. The seeds have an aromatic smell, and warm pungent taste, and yield much essential oil.

*Med. use.*—They are employed as stomachic and carminative in flatulent colics.

CASSIA.

Willd. *g.* 813. *Decandria Monogynia.*—Nat. ord. *Lomentaceæ.*

*Sp.* 18. CASSIA FISTULA. *Ed. Dub. Lond.*
Cassia tree.

*Off.*—The fruit and its pulp.
PULPA CASSIÆ. Lomentorum pulpa. *Lond.*
PULPA FRUCTUS CASSIÆ FISTULARIS. *Dub.*
FRUCTUS CASSIÆ FISTULÆ. *Ed.*

THIS tree is indigenous in India and Egypt, and is cultivated in Jamaica. It rises to about thirty feet high, and has long flower spikes, with yellow papilionaceous blossoms.

Its fruit is a cylindrical pod, scarcely an inch in diameter, a foot or more in length; the outside is a hard brown bark; the inside is divided by thin transverse woody plates, covered with a soft black pulp, of a sweetish taste, with some degree of acrimony. There are two sorts of this drug in the shops; one brought from the East Indies, the other from the West (Cassia Javanica ?) The canes or pods of the latter are generally large, rough, thick-rinded, and the pulp nauseous; those of the former are smaller, smoother, the pulp blacker and of a sweeter taste, and is preferred to the other. Such pods should be chosen as are heavy and new, and do not make a rattling noise, from the seeds being loose within them, when shaken. The pulp should be of a bright, shining, black colour, and have a sweet taste, neither harsh, which happens from the fruit being gathered before it was fully ripe, nor sourish, which it is apt to become upon keeping, nor at all mouldy, which is frequently the case from its being kept in damp cellars, or moistened, in order to increase its weight. Greatest part of the pulp dissolves both in water and in alcohol, and may be extracted from the pod by either. The shops boil the bruised pod in water, and afterwards evaporate the solution to a due consistence.

Vauquelin has analyzed this pulp, and found it to consist of parenchyma, gluten, gelatin, gum, extractive and sugar.

*Med. use.*—The pulp of cassia, from its saccharine and extractive constituents, is a gentle laxative medicine, and is frequently given, in a dose of some drachms, in costive habits. Some direct a dose of two ounces, or more, as a cathartic, in inflammatory cases, where the more acrid purgatives are improper; but in these large quantities it generally excites nausea, produces flatulence, and sometimes gripings of the bowels, especially if the cassia be not of a very good kind: these effects may be prevented by the addition of aromatics, and by exhibiting it in a liquid form.

*Sp.* 24. CASSIA SENNA. *Ed. Lond. Dub.*
Senna.

*Off.*—The leaves.
FOLIA CASSIÆ SENNA. *Ed.*
FOLIA SENNÆ. *Lond. Dub.*

This species of cassia is annual, although in its mode of growth it resembles a shrub, and sends out hollow woody stems, to the height of four feet. It grows principally in Upper Egypt, from whence the leaves are brought, dried, and picked from the stalks, to Alexandria in Egypt, and thence imported into Europe. They are of an oblong figure, sharp-pointed at the ends, about a quarter of an inch broad, and not a full inch in length, of a lively yellowish green colour, a faint, not very disagreeable smell, and a sub-acrid, bitterish, nauseous taste. Some inferior sorts are brought from other places: these may be easily distinguished by their being either narrower, longer, and sharper-pointed, from Mocha: or larger, broader, and round pointed, with small prominent veins, from Italy; or large and obtuse, of a fresh green colour, without any yellow cast, from Tripoli.

It has been customary to reject the pedicles of the leaves of senna, as causing gripes and pains in the bowels; but this is a mere prejudice, for both leaves and pedicles act in the very same way. Neumann, from 480 parts of senna, got 143 alcoholic extract, and afterwards 140 watery; and inversely, 245 watery, and only 20 alcoholic, so that it seems to consist chiefly of mucilage and extractive. Bouillon Lagrange found in 100 parts of a watery extract 31.19 of extractive, 14.57 of sulphate of potash, and 4.16 of talc.

*Medical use.*—Senna is a very useful cathartic, operating mildly, and yet effectually; and, if judiciously dosed and managed, rarely occasioning the bad consequences which too

frequently follow the exhibition of the stronger purges. The only inconveniences complained of in this drug are, its being apt to gripe, and its nauseous flavour.

These are best obviated by adding to the senna some aromatic substance, as ginger, cinnamon, &c. and by facilitating its operation by drinking plentifully of any mild diluent.

Senna may be given in substance to the extent of about a drachm, but this is rather too bulky, and it is therefore better to divide it into two doses, and to take one half at night, and the other in the morning. It is more conveniently given in the form of infusion, which is generally made by pouring about six ounces of boiling water upon from two to six drachms of senna leaves in a tea-pot, and letting it stand about an hour. Senna ought never to be ordered in decoction, Gren says, because it becomes perfectly inert, from the total dissipation of the nauseous and volatile principles on which its purgative effects depend. The tincture, on account of the menstruum, cannot be given in doses large enough to purge.

CASTOR FIBER. *Ed. Dub. Lond.*
*Mammalia Rodentia*, Cuvier.
The beaver.

*Off.*—Castor, a substance collected in follicles near the anus.
CASTOREUM. *Ed.*
*a)* CASTOREUM ROSSICUM. *Dub.*
CASTOREUM, concretum sui generis. *Lond.*
*b)* CASTOREUM CANADENSE. *Dub.*

THE beaver is an amphibious quadruped, strongly characterised by its flat, horizontal, scaly tail. It is found in the northern parts of Europe, Asia, and America, on the banks of lakes and rivers. In inhabited countries it is a solitary slothful animal, but in desert regions it lives in society; their remarkable manners in this state, and the immense works effected by the united labours of the individuals of their republic, have rendered the natural history of this animal familiar to every one. In both sexes, between the anus and pudendum, there are four follicles, of an oblong shape, smaller above, and larger below, formed of a tough membrane, almost resembling leather. The two largest and undermost of these, which are also connected, and lie parallel and close to each other, contain an oily fluid secretion, which is the substance known by the name of Castor. It is preserved by cutting out the entire bags, and drying them in the smoke.

The best castor comes from Russia, Prussia, and Poland. The cods should be dry, gibbous, roundish, heavy, solid, and

filled with a solid substance contained in membranous cells, somewhat tough, but brittle, of a dark-brown colour, of a peculiar disagreeable, narcotic smell, and a nauseous, bitter, acrid taste. The Canadian castor is of an inferior quality; the cods are smaller, thin, oblong, and much corrugated, and the castor itself has much less smell and taste: what is very old, quite black, and almost destitute of smell and taste, is unfit for use, as well as the counterfeited castor, which is a mixture of various gummy resins and other substances, with a little real castor, artificially interspersed with membranes, and stuffed into the scrotum of a goat. This imposition is easily detected, by the weaker degree of its smell and taste, by chemical analysis, and even by mere external examination; for to the real bags, the two smaller and upper follicles, filled with a fatty matter, are always attached.

Neumann got from 480 parts of castor, 140 alcoholic extract, and afterwards 80 watery; and inversely, 140 watery, and 20 alcoholic. The first alcoholic extract retained the whole flavour of the castor, as none of it rose in distillation with the alcohol. The distilled water, on the contrary, contained the whole flavour, and the watery extract was merely bitter. Cartheuser obtained from it a volatile oil by distillation. Bouillon Lagrange says it is composed of a resin, adipocere, volatile oil and extractive, and Laugier has discovered benzoic acid in it. Borm of Amsterdam analysed fresh castor, and found it to consist of one-third of volatile oil, one-half of adipocere, and a little resin; one-sixth of membrane, and one-fourth of carbonate of lime. It lost by drying 40 *per cent.* The essential oil therefore seems either to be dissipated by drying, or converted into resin by the absorption of oxygen.

*Med. use.*—Castor is an excellent antispasmodic. It is very little heating, and acts particularly on the uterine system.

It is given with advantage,

1. In typhoid fevers.
2. In spasmodic diseases, especially in hysteria and epilepsy, and in cases of difficult parturition, from a spasmodic contraction of the mouth of the uterus after the membranes have burst.
3. In amenorrhœa.

It is exhibited most advantageously in the form of powder, in doses of from 10 to 20 grains, and in clysters, to a drachm. Diluted alcohol extracts its virtues; therefore it may be also given in the form of tincture. But its exhibition in the form of extract or decoction is improper.

Centaurea benedicta. *Ed. Dub.*

Willd. *g.* 1548, *sp.* 89. *Syngenesia Polygamia frustanea.*—Nat. ord. *Compositæ capitatæ.*

Blessed Thistle.

*Off.*—The leaves or plant.

Herba centaureæ benedictæ. *Ed.*

Folia cardui benedicti. *Dub.*

This is an annual plant, indigenous in the Grecian islands, and cultivated in our gardens. It flowers in June and July, and perfects its seeds in the autumn. The herb should be gathered when in flower, quickly dried, and kept in a very dry airy place to counteract its tendency to rot, or grow mouldy. The leaves have a penetrating bitter taste, not very strong or very durable, accompanied with an ungrateful flavour, from which they are in a great measure freed by keeping. Water extracts, in a little time, even without heat, the lighter and more grateful parts of this plant; but if the digestion be continued for some hours, the disagreeable parts are taken up. A strong decoction is very nauseous and offensive to the stomach. Rectified spirits acquire a very pleasant bitter taste, which remains uninjured in the extract.

Neumann got from 1920 parts 270 alcoholic, and afterwards 390 watery extract; and inversely, 600 watery, and 60 alcoholic.

*Med. use.*—The virtues of this plant seem to be little known in the present practice. The nauseous decoction is sometimes used to provoke vomiting, and a strong infusion to promote the operation of other emetics. But this elegant bitter, when freed from the offensive parts of the herb, may be advantageously applied to other purposes. Excellent effects have been frequently experienced from a slight infusion of carduus, in loss of appetite, where the stomach was injured by irregularities. A stronger infusion, made in cold or warm water, if drunk freely, and the patient kept warm, occasions a plentiful sweat, and promotes the secretions in general.

The extract prepared by evaporating the expressed juice, with the addition of a little alcohol, to prevent it from becoming mouldy, has been strongly recommended in the catarrh of children.

The seeds of this plant are also considerably bitter, and have been sometimes used with the same intention as the leaves.

Cera flava. *Ed. Lond. Dub.*

Yellow wax.

For this useful substance we are indebted to the common

honey bee *(apis mellifica)*, an insect belonging to the class of *Hymenoptera mellita* of Cuvier. It is, however, a vegetable production, and is collected by the bees from the surface of leaves, and the antheræ of flowers. They employ it to form the combs in which the honey and larvæ are deposited.

It is found in the shops in round cakes, which are formed by melting the combs in hot water, after all the honey has been expressed from them. The wax swims above, and the impurities either sink to the bottom, or are dissolved in the water. When recent, it is tenacious, but brittle, of a yellow colour, and sweet honey-like smell; dry, not greasy, to the feel; insoluble in water, and in cold alcohol, or ether; soluble in boiling alcohol and ether, in the fat oils and alkalies; fusible and inflammable. In selecting it, we should observe that the cakes be brittle, have a pleasant yellow colour, and agreeable smell, no taste, do not adhere to the teeth when chewed, and burn entirely away. When adulterated with resin, the fraud is detected by its taste, and the action of alcohol, which dissolves the resin. When mixed with pease-meal or earthy substances, it is more brittle, of a paler colour, and may be separated from them by liquefaction and straining. When combined with tallow, it becomes less brittle, and softer, and has an unpleasant smell.

CERA ALBA. *Lond. Ed. Dub.*
White wax.

THE yellow colour of bees wax, and its peculiar smell, may be destroyed by the combined action of water, air, and the sun's rays. In the process of bleaching wax, we therefore extend its surface as much as possible, by melting it, and forming it into thin plates, which are fully exposed to the sun's rays, upon linen stretched in frames, and repeatedly moistened until they acquire the whiteness desired. It is then usually melted into thin discs. White wax is more brittle, less fusible, and heavier than yellow wax. It is sometimes mixed with white oxide of lead, or with tallow. For medical use, it has no advantage over yellow wax.

*Medical use.*—When taken internally, wax agrees in its effects with the fat oils, and though less frequently prescribed in this way, it is preferable, being less apt to become rancid. Poerner recommends it as an excellent remedy in diseases of the intestines, attended with pain, excoriation, and obstinate diarrhœa. He gave a scruple, or half a drachm of wax, three or four times a-day, in the form of an emulsion, by melting it first with some fixed oil, and then mixing it with a decoction of groats, by trituration with the yolk of an egg. But

its principal use is in the formation of cerates, ointments, plasters, &c.

Cerevisiæ fermentum. *Lond. Ed.*
Barm or yeast,

Barm or yeast has lately been much extolled as an antiseptic remedy in putrid fevers. A table spoonful is recommended to be given as a dose, in porter, or wine and water. It is also applied externally, in the form of a poultice, to foul and putrid sores.

Cervus elaphus. *Ed. Dub. Lond.*
*Mammalia ruminantia.*
The stag, or hart.
*Off.*—The horns.
Cornu cervi elaphi. *Ed.*
Cornu cervinum. *Dub.*
Cornua. *Lond.*

The male has two round solid horns on his forehead, with several conical branches, the number of which ascertains the age of the animal to which they belong. These horns fall off, and are renewed every year. When first produced, they are soft, full of blood-vessels, and covered with velvety skin; but they soon lose their covering, and become hard, compact, and bony.

In their nature, they do not seem to differ from bone, except in containing a larger proportion of cartilage. They afford a very considerable quantity of gelatine, by decoction with water, and hartshorn shavings are still employed in domestic economy, for furnishing a nutritious and demulcent jelly. By the action of fire, their products are the same with those of animal substances in general; and they were formerly so much used for the preparation of ammonia, that it was commonly called Salt or Spirit of Hartshorn. By burning, they are totally converted into phosphate of lime.

Chironia centaurium. *Ed. Dub. Lond.*
Willd. *g.* 394, *sp.* 9. Smith. *Flor. Brit. g.* 102. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Rotaceæ.*
Smaller centaury.
*Off.*—The flowering heads.
Summitates chironiæ centaurii. *Ed.*
Cacumina centaurii. *Lond.*
Cacumina florentia centaurii minoris. *Dub.*

This plant is annual, and grows wild in many parts of Eng-

land on barren pastures. It flowers between June and August. The corolla is said to have no taste ; and therefore the herb, which is intensely bitter, should be preferred to the flowering tops, which derive their virtues only from the stalks connected with them. It agrees in every respect with other pure bitters.

Neumann got from 480 parts 210 alcoholic, and 140 watery extract, and inversely 320 watery, and 40 alcoholic.

Cinchona.

Willd. *g.* 346. *Pentandria Monogynia.*—Nat. ord. *Contortæ.*

*Sp.* 1. Cinchona officinalis. *Dub.*
*Sp.* Cinchona cordifolia. *Lond. Ed.*
*Sp.* Cinchona lancifolia. *Lond. Ed.*
*Sp.* Cinchona oblongifolia. *Lond. Ed.*

*Off.*—The bark, commonly called *Peruvian bark*, of which there are three varieties, the *pale*, the *yellow* and the *red.*

Cortex peruvianus. *Dub.*
*a)* Cortex communis cinchonæ.
Cortex cinchonæ lancifoliæ. *Lond. Ed.*
*b)* Cortex flavus cinchonæ.
Cortex cinchonæ cordifoliæ. *Lond. Ed.*
*c)* Cortex ruber cinchonæ.
Cortex cinchonæ oblongifoliæ. *Lond. Ed.*

Three varieties of Cinchona bark are officinal in the Empire, distinguished by the appellations of pale, yellow and red.

1. *Pale Bark.*—In commerce, we have several varieties of the common pale bark, the most remarkable of which are, the quilled bark, which comes from Loxa, and the flat bark, from Guanaco.

The bark which comes from Loxa consists of thin, singly or doubly rolled pieces, four or five inches long, and scarcely a line in thickness ; externally rough, of a greyish brown colour, and generally covered with a kind of lichen ; internally of a cinnamon colour. Its fracture should not be fibrous or powdery, but even and shining. It has a peculiar aromatic smell, and a pleasant bitter, astringent taste.

The bark which comes from Guanaco consists of much thicker, coarser, and flatter pieces ; externally of a dark brown or almost black colour, but internally it has the same cinnamon colour ; and in its resinous fracture, smell, and taste, it exactly resembles the former. When genuine, both varieties are excellent remedies, although the former be generally preferred on the Continent, and the latter in Britain.

2. *Yellow Bark.*—Yellow bark consists of pieces about six inches in length, thicker, and less rolled up than the common bark. Its internal surface is of a deeper red. It sometimes wants the epidermis, which is often as thick as the bark itself. It is lighter and more friable than the former variety; its fracture is fibrous; and when reduced to powder, its colour is paler. Its taste is much more bitter, astringent, and stronger; but its smell is weaker. Its decoction, when hot, is redder; but when cold, paler. Its solution strikes a deeper colour with sulphate of iron. It contains more of the active constituents than either of the others. but less gum than the common, and less resin than the red. It is much more powerful than the preceding species; according to Mutis, it is the only one which is directly febrifuge; and we are informed by Humboldt, it is that which is most esteemed at Loxa, and known by the name of *Cascarilla fina.*

3. *Red bark.*—It occurs generally in much larger, thicker, flatter pieces, but sometimes also in the form of quills. It is heavy, firm, sound, and dry; friable between the teeth; does not separate into fibres; and breaks, not shivery but short, close, and smooth. It has three layers: the outer is thin, rugged, of a reddish brown colour, but frequently covered with mossy matter; the middle is thicker, more compact, darker coloured, very resinous, brittle, and yields first to the pestle: the inmost is more woody, fibrous, and of a brighter red. Its powder is reddish, like that of Armenian bole. Its astringency and bitterness are more intense, and it contains more resin than the pale bark. It is not, however, allowed by Mutis to be, like the yellow bark, directly febrifuge. It is said to be more frequently adulterated.

The great price of cinchona bark has sometimes tempted dishonest men to adulterate it with other similar and less powerful barks, and, what is still more blameable, with genuine bark, from which the active constituents have been entirely extracted, by decoction with water.

In selecting Cinchona bark, we must therefore take care, that besides the characteristics already noticed, it be dense, heavy, and dry, not musty, or spoiled by moisture, and that a decoction made of it have a reddish colour when warm, but when cold become paler, and deposite a brownish red sediment. Those pieces whose taste is simply intensely bitter or very astringent, or nauseous, or merely mucilaginous, whose surface is smooth or polished, of a dark colour, or pale yellow, or red, which are tough or spongy, whose fracture is fibrous, woody, or powdery, and their internal colour white or grey, are to be rejected. It is still more difficult to know

genuine Cinchona bark in the form of powder. I have examined specimens differing in price from 2 s. 6 d. a pound to 12 s. and could not establish any criterion of distinction between them, either in their sensible or chemical properties; and yet the former must have been very much adulterated. Indeed it is said that it is scarcely possible to meet with genuine powder of Cinchona; for it cannot be produced sufficiently fine by means of a pestle and mortar; and when an apothecary is even at the trouble to select good bark, and sends it to a bark-mill, he must depend upon the accuracy of many individuals for receiving back the very article he sent.

The history of the discovery of the febrifuge powers of Cinchona is uncertain. In Loxa there is no document to illustrate it, and there is no probability that the Jesuits learned its use from the natives, as they obstinately retain their customs like the natives of Hindostan; and although fever is very common among them, they would rather die than take cinchona, which they class, with opiates, among the poisons causing gangrene. There is an old tradition in Loxa, that the Jesuits used to distinguish the different kinds of trees by chewing their bark, and were attracted by the great bitterness of the Cinchona; and as among their missionaries there were always some acquainted with medicine, the story that they tried an infusion of it in the endemic fever of the country is not improbable. The appellation *Pulvis Comitissae* seems to be even older than *Pulvis Jesuiticus* or *Pulvis Patrum*, and there was a Count Cinchona Viceroy in Lima from 1629 to 1639, whose Countess, said to have been cured of fever by it, on her return to Spain in 1640 probably first made it known in Europe.

From 1638 to 1776 no other Cinchona occurred in commerce except that of Loxa and the neighbouring district. La Condamine mentions the cinchona of Riobamba and Cuença in the province of Quito, as well as that of Ayavaca and Jaen de Bracamorros; but he was not acquainted with that of the interior of Peru about Huanuco and La Paz, nor that of New Grenada. In 1753 Don Miguel de Santistevan, in travelling from Loxa to Santa Fé de Bagota by Popayan, observed that every where at the same elevation with Loxa there were cinchona trees. From him, in 1761, Mutis received the first specimen of *C. cordifolia*. Still no use was made of this discovery until Mutis, in 1772, found Cinchona near Santa Fé, and sent it to Europe from Carthagena. Till then all the cinchona was gathered in the woods of Loxa, Ayavaca and Jaen de Bracomorros, and shipped under the name of *Cascarilla fina de Uritasinga*, at Payta, to double

Cape Horn. On 1776 Don F. Renquifo discovered the *C. nitida* of Ruiz at Huanuco. Ruiz and Pavon, authors of the *Flora Peruviana*, examined the valleys of the tributaries of the Amazon river, and almost at the same time cinchona was found in the northern and southern extremities of South America, in the mountains of Santa Martha, and in the kingdom of Buenos Ayres, at La Paz and Cochabamba. Since 1780 Europe has received cinchona of different value from Payta, Guayaquil, Lima, Buenos Ayres, Carthagena and Santa Martha.

Great confusion was thus introduced. Barks, which were certainly febrifuge, but the produce of trees not belonging to the genuine Cinchona, were called Quina; and without considering that febrifuge barks may possess equal power, and yet differ in their mode of action, cinchona barks were divided into genuine and spurious. China, resembling that of Loxa, was in demand, without considering that even in 1738 three or four kinds of bark came to Europe from Loxa, the produce of different species of cinchona. It was overlooked that the goodness of the bark did not depend solely upon whether it was the produce of the *C. lancifolia* or *C. macrocarpa*, but as much upon its place of growth, the age of the tree, and its being dried quickly or slowly. The same species was not recognised, if it was sent in flat pieces or in powder, instead of quills; and partly from inattention, partly from fraud, barks of the *Wintera Granadensis* and of the astringent *Weinmannia*, and of the West India cinchonas were mixed with the continental cinchonas, and the latter was even coloured with infusion of brazil wood. The most absurd prejudices in regard to the different kinds of cinchona were propagated. The commercial houses in Spain, which had been in possession of the Loxa bark trade for half a century, depreciated that of Grenada and South Peru; and after the monopoly of the latter fell into their hands, they carried their jealousy so far, that they caused to be burnt in Cadiz a quantity of the finest orange bark, collected at the king's expense by Mutis himself, as a perfectly inert drug, while all the Spanish military hospitals were in the greatest want of it. A parcel of this condemned bark was smuggled to England, and rose to a very high price; and the Santa Fê bark continues to be smuggled from Carthagena by the Americans and English to all Europe, except Spain, which is chiefly supplied with barks from Peru by way of Cadiz.

The three kinds of Cinchona bark are found in commerce. By the London and Edinburgh Colleges each is referred to a different species, that is, the pale bark to the *C. lancifolia* ;

the yellow to the *C. cordifolia*, and the red to the *C. oblongifolia;* but after reading Humboldt's account of the Cinchona forests again and again, I cannot satisfy myself that, except in the last instance, they are right. Humboldt distinctly says, indeed, that the *C. cordifolia* furnishes the yellow bark; but he also says as precisely and repeatedly that the *C. lancifolia* produces the orange-coloured bark. Now, as this certainly cannot be our pale bark, I conjecture that his orange is our yellow, especially when we attend that the Santa Fé bark smuggled into England, and so highly prized, was the orange-coloured bark from New Grenada, which is his orange-coloured bark; and when we add, that the Spanish appellation *Quina amarilla*, which he translates yellow, literally means wan or sallow coloured, and is afterwards identified with the *Cascarilla pallida* of Ruiz; and as the *Cinchona pubescens*, which furnished a part of the Cinchona in commerce before our yellow was discovered, is synonymous with *C. cordifolia*, I think it more probable that this last produces our pale bark, and that our yellow is the produce of the *C. lancifolia*, thus reversing the statement of the Colleges. But I must not omit to mention, that in the *Plantae Æquinoctiales* it is said that the greatest part of the Cinchona of Jaen de Bracamorros is furnished by the *C. scrobiculata*, which he describes as a distinct species, although, in his subsequent paper, he does not notice it even as a synonime, which betrays a want of accuracy or certainty in that distinguished author. According to my present opinion our yellow bark was the first discovered, and is the produce of the *Cinchona condaminea*, and of the *C. lancifolia*, our pale is the bark of the *C. cordifolia*, and our red certainly of the *C. oblongifolia*.

Cinchona, considered as a genus, is a mountainous tree, never found in the plains, and growing between the height of 1282 and 975 toises above the level of the sea. It grows to a great height, and formerly its trunk was often thicker than a man's body. But since its bark has come into such general use, few trees are to be seen thicker than the arm. Indeed, there is reason to fear that it will become still more scarce, as no attention is paid to its cultivation, and the trees always die after being stripped of their bark. This operation is performed in the dry season from September to November. The bark is then carefully dried in the sun, and packed in skins, which contain from 100 to 150 pounds, and are called by the Spaniards *zeronne*. In these, coarse and fine pieces of the same kind of bark are promiscuously mixed, but they are afterwards sorted. Humboldt says, that from 12 to 14,000 quintals are annually exported. 2000 are exported from Car-

thagena, and come from the kingdom of Santa Fé. Loxa furnished, previous to 1779, 4000 quintals, but now only 110, which are sent to Spain on account of the king. The rest is furnished by the provinces of Huamanga, Cuenço, Jaen de Bracamorros, &c. and are exported from Lima and other parts of the Pacific Ocean. The genus Cinchona is naturally subdivided into those species whose corolla is hairy and those whose corolla is perfectly smooth, and the barks of all the species included in the first division are febrifuge. They are the Condaminea, Lancifolia, Cordifolia, Oblongifolia, Ovalifolia, Brasiliensis and Excelsa.

The bark is principally got from the following species of Cinchona, the first of which, however, is not officinal.

*C. Condaminea*, corollae tubo hirto, foliis ovato-lanceolatis utrinque glaberrimis, in axillis nervorum inferne scrobiculatis. Humboldt and Bonpland. It furnishes the *Cascarrilla fina* or superior bark of Uritasinga, which has always been considered in Spain as the most efficacious in the cure of tertian, and is now only collected for the king's apothecary, and therefore cannot ever occur in commerce legally. It grows exclusively in the neighbourhood of Loxa, in 4° south lat. at a height between 900 and 1200 toises, and in a somewhat milder climate than *C. lancifolia*, having a medium temperature of 65 to 70 F., or nearly that of the Canary Islands.

*Cinchona lancifolia*, foliis lanceolatis, cunctis utrinque glaberrimis; known in Santa Fé by the appellation of *Quina Naranjada* or Orange china. It loves a raw climate. It grows between the 4th and 5th degree of north latitude, on the declivity of hills, and between the heights of 700 to 1500 toises. The medium temperature of the situation is about that of Rome, or 60 F.; but the trees in the highest places are generally exposed to a temperature of 50 or 55. In these alpine forests the cold often sinks for an hour to the freezing point, but no snow falls in this latitude below 1500 toises. This species is rare. While the *cordifolia* and *oblongifolia* form in some places in Santa Fé continued thickets, the *lancifolia* always stands alone, and is so more difficultly propagated by suckers. The synonymes of this species are the *C. angustifolia* of Ruiz, *C. nitida*, Flor. Peruv., *C. lanceolata*, Flor. Peruv., and perhaps *C. lampina*, *C. glabra*, and *C. rosea*.

*Cinchona cordifolia*, foliis orbiculato-ovatis, saepe subcordatis, subtus tormentosis, supra pubescentibus. Var. β. foliis vix cordatis utrinque glabris. Var. γ. foliis utrinque hirsutis.

*Quina amarilla*, or yellow china of Santa Fé. It grows in north lat. 4° at a height between 900 and 1440 toises. It is identical with the *C. pubescens* of Vahl, and also with *C. ovata*, Flor. Peruv., the pale bark of Ruiz; and presents varieties in *C. hirsuta*, Flor. Peruv., and *C. tenuis*, Ruiz; and perhaps in *C. purpurea*, Ruiz.

*C. oblongifolia* foliis oblongis, acuminatis, glabris, filamentis brevissimis, antheris infra medium tubi latentibus. Red China of Santa Fé. It grows in 5° north lat. at a height between 600 and 1300 toises, and is particularly common near the town Maraquita. It is identical with *C. magnifolia*, Flor. Peruv., called Yellow bark in the Quinologia.

There are few vegetable substances which have been subjected to analysis more frequently, and by abler chemists, than the Cinchona bark. But from the difficulty of the subject, and from essential differences in the chemical properties of several varieties confounded under one denomination, contradictory results have arisen, and our knowledge of the subject is still imperfect.

I shall begin by recapitulating the earlier experiments. Neumann got from 7680 parts of common cinchona 640 alcoholic, and afterwards 300 watery extract; and inversely 330 watery and 600 alcoholic; from which it might be inferred, that there were about 600 parts soluble in alcohol only, 300 in water only, and 30 or 40 in both; but the proportion of the last is certainly too small. Fourcroy extracted from 576 parts of red bark, 38 by water, and afterwards 24 by alcohol. Marabelli got from a pound of yellow bark 464 grains of gum, 470 of extractive mucous matter, 292 of extractive resinous matter, and 125 of resin, besides saline matters, &c. Lewis observed, that the decoction became turbid on cooling, and that the precipitate was soluble in alcohol. He also pointed out the deep green colour which decoctions of cinchona acquire from the addition of chalybeates. Dr Irvine afterwards found, that recent decoctions gave a black colour, while those which had been kept some time gave a green. I may add, that the tincture gives a black, while the cold infusion gives a green; and that, in all cases where an excess of the chalybeate is used, a green colour is produced. These effects have been ascribed to the presence of tannin; bnt they have little resemblance to the intensity and durability of the blue colour produced in infusions of gall-nuts, and other powerful astringents. They, however, shew, that the principle on which the colour depends is more soluble in alcohol and in boiling water, than in cold water, and that it is very destructible. It was long believed that cinchona was a powerful astringent; but after

Seguin's discovery of gelatine as a test of the principle of astringency, Dr Maton found that cinchona contained very little tannin. In my experiments, solution of gelatine did not affect the cold infusion, but precipitated the tincture, diluted with water and filtered, slightly, and the filtered decoction copiously. The precipitate in the last case was filamentous, and exactly resembled that produced by gelatine in infusion of galls. Hence it appears that the tannin in cinchona is much less soluble in alcohol and in cold water, than in hot. Dr Maton discovered, that infusion of cinchona was precipitated by infusion of nut-galls. Seguin, who afterwards made the same observation, concluded from it that cinchona contained gelatine, but erroneously, as I soon after proved. Infusion of galls is precipitated copiously, not only by the filtered decoction of cinchona, but also by the infusion and tincture diluted and filtered; and as these phenomena are inconsistent with the properties of gelatine or starch, (the only other principles which, so far as I know, precipitate infusion of galls,) I conceived myself authorised to ascribe them to a vegetable principle, not hitherto examined, soluble in alcohol and in water, and called it Cinchonin. Seguin supposed that it was the tannin of the infusion of galls which formed the precipitate in infusion of cinchona; but this is extremely doubtful; for, as I have stated in Nicolson's Journal, vol. vii, a decoction of cinchona is precipitated both by gelatine and galls, and when saturated by either of these re-agents, is still acted upon by the other; but an infusion of galls, after being saturated with gelatine, does not act on a decoction of cinchona. "Now, if gelatine deprived the infusion of galls of no other principle but tannin, it would follow, that a decoction of cinchona contains both tannin and a principle precipitable by tannin, which can scarcely be the case; and indeed we do not at present see any way of accounting for the facts, but by supposing that the galls and cinchona contain each of them tannin, and another principle, of a different nature in each, not precipitable by tannin, but by each other." It is satisfactory to find that great master of analysis, Vauquelin, drawing nearly the same conclusion from his observations. "It would seem that it is to the tannin of the oak bark and galls that this principle (my cinchonin) unites to form the precipitates observed in the infusions of these substances; but as this principle exists in some species which at the same time precipitate glue, it is doubtful that it really unites to the tannin of the oak bark, or that the principle in the other species of cinchona which precipitate glue is actually tannin. But the one or the other of these suppositions must be correct, as the infusions of the two species precipitate each other."

Prof. Pfaff of Kiel has also maintained this opinion.

Following up my experiments, Dr Gomez, in the Transactions of the Royal Academy of Lisbon, has published an elaborate Essay on Cinchonin, and described its properties in a state of purity. He obtained it by dissolving the extract got from the tincture, in distilled water; evaporating the filtered solution; adding to this extract portions of a strong solution of potass, until no more seemed to be dissolved; filtering the solution, and washing with cold water the residuum, which is cinchonin. "By this process there remains on the filter a substance which is white when in a state of greater purity, and pale or reddish when less so. When white it is powdery, and is easily detached from the filter. It is also bitter, inflammable, very little soluble in water, but soluble enough when recently prepared, in sulphuric ether, alcohol, in diluted sulphuric, nitric, and muriatic acids, in the acetic, oxalic, citric, *malic*; but not in the *tartaric* acid *. From these solutions, which are made without effervescence, it is precipitated by the infusion of galls, and the precipitate is white and capable of being redissolved by alcohol." This impure cinchonin is purified by dissolving it in the best alcohol, filtering it, and adding to the solution an equal quantity of distilled water. The mixture is left in a glass loosely covered with paper, until the odour of alcohol disappear; it is then strained, and the residuum is left to dry on the filter, forming very fine, small and white filiform crystals, which Dr Gomez has ascertained to be possessed of the following properties.

"1. These very fine and minute filiform crystals, rubbed between the fingers, are converted into a white and very subtle powder, resinous to the touch, as if we were rubbing between the fingers powder of colophony.

"2. They are insipid and inodorous, but they seem to dissolve in the saliva.

"3. Exposed to the flame of a candle by means of a glass rod, they decrease in volume, exhale smoke with a peculiar odour, not disagreeable, melt, taking a chesnut colour, and burn with a clear and white flame.

"4. They are insoluble in water either cold or warm, for water agitated with them and strained does not give any precipitate with the infusion of galls.

"5. Mixed with the cold aqueous infusion of *cinchona pubescens* of Brazil (which does not give any precipitate with the

* I doubt of its solubility in malic acid, and of its insolubility in tartaric acid, for I suspect the purity of the acids I employed.

infusion of galls, but becomes turbid with the solution of glue, and dark greenish-brown with the solution of sulphate of iron,) it forms a turbid and gelatinous liquor, which, when strained, gives, with the infusion of galls, a precipitate redissoluble by alcohol.

"6. They are soluble in alcohol, sulphuric ether, in the diluted sulphuric, nitric, and muriatic acids, in the acetic, oxalic, citric, in the gallic, in the malic? not in the tartaric?

"7. The acid solutions give a white precipitate with the infusion of galls, which is completely redissolved by alcohol. If to the same solutions we add any of the three alkalis, a precipitate is formed in white flakes, which is redissolved by alcohol.

"8. The solution in sulphuric acid is speedy, complete, and without effervescence. The precipitate, which the solution of potassa forms in this, is as white as lime, insipid, inflammable like the crystals, is dissolved slowly, but completely, in alcohol, from which it is precipitated by water in smaller crystals, but very similar to the primitive ones.

"9. Lime-water does not seem to precipitate the solution of the crystals in muriatic acid, even though it be added in excess. This mixture gives, with the infusion of galls, a precipitate which is only dissolved in part by alcohol.

"10. From these properties it seems to me, that the following conclusions may be deduced: 1*mo*, That the crystals are a pure vegetable principle. This appears from the regular and crystalline form which they assume, from their complete solubility in sulphuric acid, and from the precipitate which potassa forms in this solution, having the same properties as the crystals. 2*do*, That this pure principle is the cinchonin of Dr Duncan, since it gives, with the infusion of galls, a white precipitate capable of being dissolved by alcohol. 3*tio*, That this principle, in its insolubility in water, its inflammability and solubility in alcohol and ether, bears some analogy to resin, but differs from it by its crystallization and solubility in the acids. 4*to*, That by these last properties it is somewhat analogous to camphor, from which it differs, however, in being without odour, in being precipitated crystallized from the alcoholic solution; in having greater specific gravity, since it sinks in water; in giving a precipitate with the infusion of galls, &c. 5*to*, That, by having singular and peculiar properties, it is, as Dr Duncan thought, a vegetable principle different from all others hitherto known."

Another remarkable property of some kinds of Cinchona, that of precipitating tartar-emetic, was discovered by Cornette,

who found that an infusion of one ounce of Cinchona decomposed one scruple of tartar-emetic, and was entirely deprived of its colour and bitter taste, while the antimonial lost its emetic property: and from Vauquelin's experiments with many varieties of cinchona bark, it appears that the several properties of precipitating solutions of gelatine, of tannin and tartar-emetic, are neither connected nor inconsistent with each ther, as the following examples will shew.

| | Precipitate by | | |
|---|---|---|---|
| | Glue. | Tannin. | Tartar-emetic. |
| Quinquina of Loxa, | copious | copious | copious |
| ———— Pittonorai, | 0 | copious | copious |
| ———— red | red | o | yellowish-white |
| ———— Santa Fé, | reddish | copious | 0 |
| Cinchona magnifolia, | copious | 0 | 0 |
| ———— officinalis, | 0 | yellow | 0 |

Dr Irving obtained from Cinchona a small portion of volatile oil, on which its aroma depends; and Fourcroy and other chemists have observed, that during the evaporation of an infusion or decoction of cinchona, exposed to the air, an insoluble pellicle is formed on the surface. Fabroni observed, that cinchona loses its solubility by long exposure to the air, and even by being reduced to very fine powder; 100 parts of cinchona, when bruised, yielding from 12 to 16 of extract, and when finely powdered only 6 or 7; and that cinchona destroys the emetic property of tartrate of antimony, without losing its febrifuge virtues.

Vauquelin has lately done much to lessen this confusion, by showing that there are three, if not four classes of Cinchona bark, differing essentially in chemical constitution; but unfortunately he has not been able to designate, with botanical accuracy, the individuals he found to belong to each.

The first class precipitate astringents, but not gelatine.

The second precipitate gelatine, but not astringents.

The third precipitate both astringents and gelatine. And,

Lastly, some barks confounded with these precipitate neither astringents nor gelatine; but these, Vauquelin, viewing the genus chemically, does not consider as Cinchonas.

Individuals in each of the three first classes are capable of curing intermittents, which shows how insufficient our analysis, in its present state, is for explaining the connection between the medical virtues and chemical properties of this remarkable genus. Besides these principal differences, on which Vauquelin founds his classification, Cinchona barks vary in the effects of many chemical agents. The infusions of some

kinds redden turnsole, others do not affect it; some impart a deep colour to water, others very little; some affect certain metallic solutions, which others do not; and the decoctions of some kinds remain transparent after becoming cold, others grow turbid as they cool, and deposite a copious precipitate. The following mode of analysis, however, will give an idea of the composition of the second class:—The cold infusion has a red colour, more or less brown or yellow; bitter taste, with more or less astringency; becoming, in a few days, covered with a green mould. On evaporating the infusion, if it be permitted to cool repeatedly during the process, it becomes turbid, and deposites a precipitate for several times. If these precipitates be separated, and the supernatant fluid, after it ceases to become turbid on cooling, be evaporated to the consistence of a soft extract, and treated with alcohol, there remains only a viscid substance, of a brown colour, almost without bitter taste, insoluble in alcohol, perfectly soluble in water, not rendering it turbid on cooling, and which, by spontaneous evaporation, is analysed into a saline mass, consisting of reddish-brown crystals, hexaedral, rhomboidal, or square, and a mucilaginous matter, which remains dissolved in the mother-water.

The precipitate which is deposited on the cooling of the concentrated infusion, when dried, has a red brown colour and an intensely bitter taste. It is readily soluble in alcohol, especially when heated. The tincture is decomposed by water, and yields crystals on spontaneous evaporation. It is sparingly and only partially soluble in cold water, more copiously and completely in boiling water, which, however, again becomes turbid on cooling. Its solution reddens tincture of turnsole, grows mouldy in a few days, does not precipitate tartar-emetic, or solution of gelatine; is not visibly acted upon by acids, but with alkalies is coagulated into a thick whitish matter, becoming brown and somewhat hard by exposure to the air, softening with heat, and acquiring the ductility and silky gloss of turpentine.

The saline mass which crystallizes from the mother-water, on being purified by repeated solutions and crystallizations, is obtained in the form of white square or rhomboidal plates, often grouped, with almost no taste, soluble in about five waters at 50°, insoluble in alcohol, destructible by fire, not decomposed by ammonia, acetate of lead, or nitrate of silver, but by the fixed alkalies, and the oxalic and sulphuric acids, and by infusion of tan, and of some varieties of cinchona. This salt M. Vauquelin discovered to consist of lime, and a new acid, which crystallizes in plates, has a very acid taste, forms soluble

and crystallizable combinations with the alkalies and earths, and does not precipitate the nitrates of silver, mercury, or lead. M. Vauquelin has given it the name of Kinic acid; but as this would lead us to suppose that it was obtained from Kino, it appears to me that it ought to be named the Cinchonic acid, from the systematic name of the tree from whose bark it has been first obtained.

M. Vauquelin has also analysed the barks of the cinchona pubescens and officinalis, which he refers to the first class. In almost every respect the analysis agrees with that now detailed, except in the chemical properties of the deposite from the concentrated infusion, which in the present instance produces a copious precipitate in the infusion of nut-galls, as well as in tartar-emetic and nitrate of mercury. These deposites, he observes, differ from resins in being soluble in water, in acids and in alkalies, in acting as a dye, in decomposing metallic solutions, and in their watery solution becoming mouldy. He is inclined to consider them as a peculiar vegetable principle, not yet sufficiently examined.

How little the analysis has hitherto accounted for the virtues of Cinchona, is evident from three of the latest writers referring its virtues to totally different principles: Deschamps to the cinchonate of lime, two doses of which, of 36 grains each, according to him, cure every intermittent; Westring to the tanning principle; and Seguin, on the contrary, to the principle which precipitates tannin, and which he at first mistook for gelatine; and upon the faith of this mistake, he and other French and Italian physicians gave clarified glue in intermittents, and it is said with success. M. Seguin, it appears, however, has now seen his error, though without retracting it, and has lately published two memoirs upon cinchona, which we proceed to abridge. He says, that hitherto apothecaries had only the external appearance, fracture, taste, and smell, to enable them to judge of the quality of cinchona; but that these characters are insufficient, and that it is only by means of chemical tests that we can ascertain the presence or proportion of the febrifuge principle. He gives with confidence the following criterions:

1. Cinchona, if good, precipitates the solution of tannin, but not those of gelatine or of sulphate of iron.

2. The precipitate which the febrifuge principle forms with the solution of tan, is reddish, slightly flocculent, and heavy. If the precipitate be considerable and sink quickly, it is a proof that the febrifuge principle is abundant and of good quality. If it be not very decided, and remain suspended in the liquor,

only disturbing its transparency, it is a proof that it is scanty and of bad quality.

3. If it does not precipitate the solution of tannin, it is a proof that it does not contain any febrifuge principle.

4. If it only precipitate the solutions of tannin and of sulphate of iron, it is a proof that it contains an astringent substance not capable of tanning, which is foreign to it.

5. If it precipitate solutions of tannin, sulphate of iron and gelatine, it is a proof that it contains an astringent substance analogous to that of the oak.

The application of these tests he describes as easy. He powders a drachm of cinchona, infuses it for half an hour in two ounces of boiling water, decants and filters the infusion. The solution of tannin is prepared by mixing two ounces with three ounces of cold water, and filtering it. A solution of nut-galls may be substituted, but it is rather too delicate. The solution of gelatine is made by dissolving an ounce of fine glue in three ounces of water in a sand bath, and filtering it through fine linen; the solution of sulphate of iron, by dissolving an ounce in two ounces of water. A little of the infusion of cinchona is put into a glass, and the re-agents added drop by drop.

He tried by these tests, &c. 600 different specimens of cinchona in Paris and Versailles, and he found very few genuine or good, but there was very little difference between the good, whether red, yellow, or pale.

Following these principles, Seguin makes six classes of cinchona.

Class 1. precipitates neither tannin nor gelatine, but forms with sulphate of iron a precipitate soluble in acids and insoluble in alkalies; properties common to astringents. False cinchona, having no febrifuge property.

Class 2. precipitates neither tan, gelatine, nor sulphate of iron.

Class 3. precipitates neither gelatine nor sulphate of iron, but acts slightly on solution of tan. These act only in large and inconvenient doses.

Class 4. precipitates neither gelatine nor sulphate of iron, but solution of tan abundantly. The best cinchona of commerce, as well as the genuine specimens sent by Mutis, are of this class.

Class 5. precipitates solutions of tan and sulphate of iron, but not gelatine. The chalybeate precipitate was ferruginous, yellow and abundant, and soluble in alkalies. He found these properties to belong to a specimen of a bark sold as angustura.

Class 6. precipitates tannin and gelatine, but not sulphate of iron. M. Seguin rarely met with this kind, but he thinks favourably of it. He also notices, as I had previously done, the co-existence of the febrifuge principle and tannin in the same solution.

Dr Gomez is of opinion, that Cinchonin is the real febrifuge principle, or at least essential to it. Having observed the great difference of different barks in the cure of fever, he supposed that chemical analysis might discover in all those that were truly febrifuge a common principle.

" To observe how far the truth of this conjecture could be extended, I began to try chemical experiments upon all the Spanish Cinchonas, and the three cinchonas and other three barks of Brazils above mentioned; and I found that all the Spanish cinchonas of our shops, one of those of the Brazils, which I had observed was febrifuge, and the barks of Goiazes, Camamu and Portlandia contained cinchonin, and that this principle was not to be found in the other two cinchonas from Rio Janeiro, that is, in the barks of the *cinchona macrocarpa*, and of the *cinchona pubescens*, which possessed very little or nothing of the febrifuge quality.

" Hence, from all these Cinchonas, and also three other barks, which contain cinchonin, being febrifuge, and from two true species of cinchona, which do not contain it, having very little or no pretensions to that title, I am inclined to conclude that cinchonin is the principle which renders cinchona, and the other vegetable substances containing it, eminently febrifuge.

*Medical use.*—On dead animal matter Cinchona acts as an antiseptic, and on the living body it acts moreover as a stimulant, tonic, and antispasmodic. The discovery of its medical virtues was, in all probability, the result of accident. In fact, according to some, the Peruvians learned its use by observing certain animals affected with intermittents instinctively led to it; or, according to others, a Peruvian having an ague was cured by accidentally drinking of a pool which, from some trees having fallen into it, tasted of cinchona: and its use in gangrene is said to have originated from its curing one in an aguish patient. It has had various appellations. About the year 1640, from curing the lady of the Spanish viceroy, the Comitissa del Cinchon, it was called Cortex or Pulvis Commitissæ, Cinchona, &c.; from the interest which Cardinal de Lugo, and the Jesuit fathers took in its distribution, Cortex or Pulvis Cardinalis de Lugo, Jesuiticus, Patrum, &c.; from the place where it was originally found, Peruvian bark, or simply, from its pre-eminence, Bark.

On its first introduction into Europe, it was reprobated by many eminent physicians; and at different periods long after, it was considered as a dangerous remedy; but its character, in process of time, became universally established.

It was first introduced for the cure of intermittent fevers; and these, when it is properly exhibited, it rarely fails to cure. But there have been considerable differences of opinion with regard to the best mode of exhibition; some prefer giving it just before the fit, some during the fit, others immediately after it. Some, again, order repeated doses between the fits; and this mode of exhibition, although it may perhaps sometimes lead to the employment of more bark than is necessary, upon the whole appears preferable, from being best suited to most stomachs. The requisite quantity is very different in different cases; and in many vernal intermittents, cinchona seems even hardly necessary.

It is now given from the very commencement of the disease, without previous evacuations, which, by retarding the cure, often seem to induce abdominal inflammations, scirrhus, jaundice, hectic, dropsy, &c.; symptoms formerly imputed to the premature or immoderate use of the bark, but which are best obviated by its early and liberal use. It is to be continued not only till the paroxysms cease, but till the natural appetite, strength, and complexion return. It is then to be gradually left off and repeated at proper intervals to secure against a relapse; to which there often seems to be a peculiar disposition, especially when the wind blows from the east. Although, however, evacuations rather counteract the effects of cinchona in the cure of intermittents, yet, previous to its use, it is advisable to empty the alimentary canal, particularly the stomach; and on this account good effects are often obtained from premising an emetic.

It is a medicine which seems not only suited to both formed and latent intermittents, but to that state of fibre on which all periodical diseases seem to depend; as periodical pain, inflammation, hæmorrhagy, spasm, cough, loss of external sense, &c.

Cinchona is now used by some in all continued fevers; at the same time attention is paid to keep the bowels clean, and to promote when necessary the evacuation of redundant bile, always, however, so as to weaken the patient as little as possible.

In confluent small-pox, it promotes languid eruption and suppuration, diminishes the fever, and prevents or corrects putrescence and gangrene.

Dr Haygarth has lately extolled its use in acute rheumatism, from the very commencement, even without premising venesection.

In gangrenous sore throats, and indeed in every species of gangrene, it is much used, both externally and internally.

In contagious dysentery, after due evacuation, it has been used, taken internally and by injection, with and without opium.

In all those hæmorrhagies called passive, and likewise in other increased discharges, it is much used; and in certain undefined cases of hæmoptysis, some allege that it is remarkably effectual when joined with an absorbent.

It is used for obviating the disposition to nervous and convulsive diseases; and some have great confidence in it, joined with sulphuric acid, in cases of phthisis, scrofula, ill-conditioned ulcers, rickets, scurvy, and in states of convalescence.

In these cases, it is proper to conjoin it with a milk diet.

In dropsy, not depending on any particular local affection, it is often alternated or conjoined with diuretics or other evacuants; and by its early exhibition after the water is once drawn off, or even begins to be freely discharged, a fresh accumulation is prevented, and a radical cure obtained.

Mr Pearson of the Lock Hospital praises very highly the powers of this remedy in different forms of the venereal disease; in reducing incipient bubo, in cleansing and healing ulcers of the tonsils, and in curing gangrenous ulcers from a venereal cause. But in all these cases mercury must also be given to eradicate the venereal virus from the system.

Peruvian bark may be exhibited,

1. In substance.

The best form of exhibiting this valuable remedy is in the state of a very fine powder, in doses of from ten grains to two drachms and upwards. Mutis and Zea say, that two drachms of true yellow bark in powder are sufficient to prevent the access of an intermittent, while, to produce the same effect, it requires the decoction of two ounces. Nay, even the residuum of an infusion is capable of curing agues, provided it be given in a larger dose than the entire powder. As it cannot be swallowed in the form of a dry powder, it must either be diffused in some liquid, as water, wine, or milk, or mixed with some viscid substance, as currant jelly. Its taste, which is disagreeable to many people, is best avoided by taking it immediately after it is mixed with the vehicle. In this respect, therefore, it is better for the patients to mix it up themselves, than to receive it from the apothecary already made up, into a draught with some simple distilled water, or into an electuary with a syrup. A much more important objection to giving cinchona in substance is, that some stomachs will not bear it, from the oppression, and even vomiting, which in these

cases it excites. We must endeavour to obviate this inconvenience by the addition of some aromatic, and by giving it in small doses more frequently repeated. If we are unable to succeed by these means, we must extract the most active constituents of the bark by means of some menstruum. It has therefore long been a pharmaceutical problem to discover which menstruum extracts the virtues of cinchona most completely. But it would be contrary to analogy to suppose, that its constituent principles should subsist so intimately mixed as they must be in an organic product, without exerting upon each other some degree of chemical affinity, and forming combinations possessed of new properties. Accordingly, we find, whether it arise from this cause, or merely from the state of aggregation, that neither water nor alcohol extract these constituents from cinchona bark in the same quantity in which they are able to dissolve them separately, and that we must have recourse to direct experiment to determine the degree of action possessed by each menstruum upon it. With this view, many experiments have been made, and by very able chemists. But most of them were performed when the science of chemistry was but in its infancy; and even at this time that branch of it which relates to these substances is so little understood, that the results of the latest experiments are far from conclusive.

2. In infusion.

To those whose stomachs will not bear the powder, this is the best form of exhibiting cinchona bark. Water, at a given temperature, seems capable of dissolving only a certain quantity of its active constituents, and therefore we are not able to increase the strength of an infusion, either by employing a larger quantity of the bark, or allowing them to remain longer in contact. One part of bark is sufficient to saturate sixteen of water in the course of an hour or two. To accelerate the action of the water, it is usual to pour it boiling hot upon the bark, to cover it up, and allow it to cool slowly. After standing a sufficient length of time, the infusion is decanted off for use. The propriety of this process may, however, be doubted; for if a cold infusion be boiled, or even gently heated, it acquires a deeper colour, and lets fall a deposite, in part insoluble in alcohol and in water. The infusion in water is however liable to one very great objection, that it cannot be kept even a very short time without being decomposed and spoiled. Therefore, in some instances, we prepare the infusion with wine; and it fortunately happens that very often the use of the menstruum is as much indicated as that of the solvend. Cinchona also prevents wine from becoming acid,

but in the course of a few days throws down its colouring matter, as nut-galls and charcoal do.

3. In tincture.

The great activity of the menstruum in this preparation, prevents the bark from being given in sufficiently large doses to exert its peculiar virtues. It is, however, a powerful stimulant.

4. In decoction.

Water of the temperature of 212° is capable of dissolving a much larger proportion of the soluble parts of cinchona bark than water at 60°. But the solvent powers even of boiling water have their limits, and by protracting the decoction we do not increase its strength, but rather, by diminishing the quantity of the menstruum, we lessen the quantity of matter dissolved. Besides, at a boiling temperature, some of the active constituents are dissipated, while others absorb oxygen rapidly from the atmosphere, and are converted into what seems to be an insoluble and inert resinous substance.

5. In extract.

In this preparation, we might expect to possess the virtues of cinchona bark in a very concentrated state. The principal objections to its use are its great expense, and the decomposition and destruction of the active constituents of the bark during the preparation, even when most carefully conducted. Not above half the weight of the dry extract is again soluble in water. It is convenient for the formation of pills and boluses, but we would always prefer a fresh infusion or decoction to any mixture in which the extract is redissolved.

Externally, cinchona bark is used in substance, as an application to ill-conditioned, carious, or gangrenous ulcers.

In the form of clyster it may be given in substance, decoction, or extract. The powder is used as a tooth-powder for spongy and bleeding gums, and the decoction is an excellent astringent gargle or wash.

To increase the power of cinchona bark, or to direct its efficacy to a particular purpose, or to correct some inconveniences occasionally produced by it, it is frequently combined with other remedies. When it produces vomiting, carbonic acid forms a useful addition; when it purges, opium; when it oppresses the stomach, aromatics; and when it induces costiveness, rhubarb. But we are afraid that many additions are made, chiefly saline substances, of which the effects are not at all understood. Sulphuric acid, super-sulphate of alumina and potass (alum,) muriate of ammonia, carbonate of potass, tartrate of potass, tartrate of antimony and potass (tartar-emetic,) iron, lime water, astringents, &c. have been

frequently prescribed with it; but we know that in many of these mixtures decomposition occurs, which renders the whole either inactive, or completely deceives us with regard to the expected effects.

CITRUS.

Willd. *g.* 1391. *Polyadelphia Icosandria.*—Nat. ord. *Pomaceæ.*

*Sp.* 2. CITRUS AURANTIUM. *Var.* Hispalense. *Lond. Dub.* Seville orange.

*Off.*—The fruit, juice and rind of the fruit, unripe fruit and distilled water of the flowers.

*a)* BACCÆ AURANTII. *Lond.*
SUCCUS CITRI AURANTII. Fructus succus. *Ed.*
SUCCUS FRUCTUS AURANTII HISPALENSIS. *Dub.*

*b)* CORTEX CITRI AURANTII. Cortex exterior fructus. *Ed.*
CORTEX AURANTII; baccarum cortex exterior. *Lond.*
EPIDERMIS FRUCTUS AURANTII HISPALENSIS. *Dub.*

*c)* FRUCTUS IMMATURUS AURANTII HISPALENSIS. *Dub.*

*d)* AQUA STILLATITIA FLORUM AURANTII HISPALENSIS. *Dub.*

THE orange tree is a beautiful evergreen, a native of Asia, but now abundantly cultivated in the southern parts of Europe, and in the West-India islands. There are several varieties of this species, but they may be all referred to the Bitter or Seville orange, and the Sweet or China orange.

The leaves are neither so aromatic nor so bitter as the rind of the fruit.

The flowers *(flores naphæ)* are highly odoriferous, and have been long in great esteem as a perfume; their taste is somewhat warm, accompanied with a degree of bitterness. They yield their flavour by infusion to rectified spirits, and in distillation both to spirit and water *(aqua florum naphæ:)* the bitter matter is dissolved by water, and on evaporating the decoction, remains entire in the extract.

A very fragrant red-coloured oil, distilled from these flowers, is brought from Italy, under the name of *Oleum* or *Essentia Neroli;* but oil of behen, in which orange flowers have been digested, is frequently substituted for it: the fraud, however, is easily detected, as the real oil is entirely volatile, and the adulterated is not.

The juice of oranges is a grateful acid liquor, consisting principally of citric acid, syrup, extractive, and mucilage.

The outer yellow rind of the fruit is a grateful aromatic bitter.

The unripe fruit dried are called Curaçoa oranges. They

vary from the size of a pea to that of a cherry. They are bitterer than the rind of ripe oranges, but not so aromatic, and are used as a stomachic.

*Medical use.*—The leaves have been celebrated by some eminent physicians as a powerful antispasmodic in convulsive disorders, and especially in epilepsy; with others, they have entirely failed. Orange flowers were at one time said to be an useful remedy in convulsive and epileptic cases; but experience has not confirmed the virtues attributed to them. As by drying they lose their virtues, they may be preserved for medical use by packing them closely in earthen vessels, with half their weight of muriate of soda. The juice of the fruit is of considerable use in febrile or inflammatory distempers, for allaying heat, quenching thirst, and promoting the salutary excretions: it is likewise of use in genuine scorbutus, or sea-scurvy. Although the Seville, or *bitter orange*, as it is called, has alone a place in our Pharmacopœias, yet the China, or sweet orange, is much more employed. Its juice is milder, and less acid; and is very frequently used in its most simple state with great advantage. Dr Wright applied the roasted pulp as a poultice to fetid sores, in the West Indies, with very great success.

The rind proves an excellent stomachic and carminative, promoting appetite, warming the habit, and strengthening the tone of the viscera. Orange-peel appears to be considerably warmer than lemon-peel, and to abound more with essential oil; to this circumstance, therefore, due regard ought to be had in the use of these medicines. The flavour of the former is likewise supposed to be less perishable than that of the latter.

*Sp.* 1. CITRUS MEDICA. *Ed. Lond. Dub.*
Lemon tree.

*Off.*—The juice and the outer rind of the fruit, and the volatile oil of the outer rind.

*a)* SUCCUS CITRI MEDICI. Succus fructus. *Ed.*
LIMONES, baccæ. *Lond.*
SUCCUS FRUCTUS LIMONIS. *Dub.*

*b)* CORTEX CITRI MEDICÆ. Cortex exterior fructus. *Ed.*
CORTEX LIMONUM. Cortex exterior. *Lond.*
EPIDERMIS LIMONIS. *Dub.*

*c)* OLEUM VOLATILE CITRI MEDICÆ ex cortice fructus. *Ed.*
OLEUM ESSENTIALE LIMONIS. *Dub.*
OLEUM LIMONUM. Corticis exterioris oleum essentiale. *Lond.*

The juice of lemons is analogous to that of oranges, from which it only differs in containing more citric acid and less syrup. The quantity of the former is indeed so great, that the acid has been named from the fruit, Acid of Lemons, and is commonly prepared from it. The simple expressed juice will not keep, on account of the syrup, extractive, mucilage, and water, which cause it to ferment.

The yellow peel is an elegant aromatic, and is frequently employed in stomachic tinctures and infusions: it is considerably less hot than orange peel, and yields in distillation with water a small quantity of essential oil: its flavour is nevertheless more perishable, yet does not arise so readily with spirit of wine; for a spiritous extract made from lemon-peel possesses its aromatic taste and smell in much greater perfection than an extract prepared in the same manner from the orange-peel.

*Med. use.*—Lemon juice is a powerful and agreeable antiseptic. Its powers are much increased, according to Dr Wright, by saturating it with muriate of soda. This mixture he recommends as possessing very great efficacy in dysentery, remittent fever, the bellyach, putrid sore throat, and as being perfectly specific in diabetes and lienteria. Citric acid is often used with great success for allaying vomiting: with this intention it is mixed with carbonate of potass, from which it expels the carbonic acid with effervescence. This mixture should be drunk as soon as it is made; or the carbonic acid gas, on which the anti-emetic power of this mixture chiefly depends, may be extricated in the stomach itself, by first swallowing the carbonate of potass dissolved in water, and drinking immediately afterwards the citric acid properly sweetened. The doses are about a scruple of the carbonate dissolved in eight or ten drachms of water, and an ounce of lemon juice, or an equivalent quantity of citric acid.

Lemon juice is also an ingredient in many pleasant refrigerant drinks, which are of very great use in allaying febrile heat and thirst. Of these, the most generally useful is lemonade, or diluted lemon juice, sweetened. Lemonade, with the addition of a certain quantity of any good ardent spirit, forms the well-known beverage, Punch, which is sometimes given as a cordial to the sick. The German writers order it to be made with arrack, as rum and brandy, they say, are apt to occasion headach. But the fact is directly the reverse; for of all spirits, arrack is most apt to produce headach. The lightest and safest spirits are those which contain least essential oil, or other foreign matters, and which have been kept the longest time after their distillation.

Coccus cacti. *Ed.*
Coccus, s. s. Coccus cacti. *Lond.*
Coccinella, s. s. Coccus cacti. *Dub.*
Cochineal.

Cochineal is the dried body of the female of a hemipterous insect. It is found only in Mexico, chiefly in the province of Oaxaia, on the leaves of a non-descript cactus, according to Humboldt. There are two kinds of the cochineal insect, which live on different species of cactus. The wild cochineal, *grana sylvester*, which is covered with a silky or cottony envelop, and is found in many places, New Granada, Quito, Peru, Mexico, is less valuable than the cultivated or powdery cochineal, which is without that covering, grows to a larger size, and furnishes a finer and more permanent colour. The Spaniards endeavour to confine both the insect and the plant on which it feeds to Mexico. But this attempt at monopoly will, we hope, be frustrated, by the exertions of some gentlemen in the East Indies, whither the insect was carried from Rio Janeiro in 1795 by Captain Nelson. The male only is furnished with wings; the female has none, and remains constantly attached to the leaf of the cactus. During the rainy season, the Mexicans preserve these insects, with the succulent leaves to which they are attached, in their houses; and after the rainy season is over, they are transferred to the living plants, and in a few days they lay innumerable eggs, and die. Or the pregnant mothers are rapidly conveyed to the neighbouring mountains, where they are kept till October, when the rains cease in the plains and commence in the mountains. They are collected three times in the year; first the dead mothers are gathered, as soon as they have laid their eggs, *grana de pastle:* in three or four months, the young, which have grown to a sufficient size, are collected; and in three or four months more, all the young are collected, large and small indiscriminately, except those which they preserve for breeding next year. They are killed by throwing them into hot water, or by turning them over in heaps in the sun, or by placing them on mats in their furnaces; which last method, though least common, preserves upon the insect that whitish powder, which enhances their price at Vera Cruz and Cadiz. Good cochineal loses but $\frac{2}{3}$ of its weight by being dried. From a very distant period, laws have existed against the adulteration of cochineal, and it is ordered to be exposed for sale in separate grains, not in agglutinated masses. 800,000 pounds are brought annually to Europe; and each pound contains at least 70,000 insects; Humboldt says, 32,000 arobas of 32 pounds each. From their

appearance, when brought to us, they were long supposed to be the seed of some plant. They are small, irregular, roundish bodies, of a blackish-red colour on the outside, and a bright purple red within. Their taste is acrid, bitterish, and astringent. They are used chiefly for the sake of the fine colour which they produce, and they are principally consumed by the scarlet dyers. Their colour is easily extracted, both by alcohol, water, and water of ammonia; and in the dried insect it is not impaired by keeping for any length of time. It is worthy of notice, that not only the fruit, but even the green joints of several species of cactus, dye cotton purple or red.

Neumann got from 1920 grains of cochineal, 1440 watery extract; and in another experiment, from the same quantity, 1430 alcoholic. The former was extremely gelatinous.

The cochineal insect has been carefully analyzed by John. He gives as its constituents 50 of a peculiar carmine red colouring matter in a soft state, 10.5 of gelatine, 10 of a waxy fat, 14 of a gelatinous mucus, 14 of membranes, and 1.5 of alkaline and earthy phosphates and muriates. The colouring matter to which he has given the name of *Cochineline*, is soluble in water, alcohol, and ether, and is precipitated from its solutions by several of the earthy and metallic salts.

*Medical use.*—Cochineal has been recommended as an anodyne to children in hooping-cough, but I do not know that it has been proved to possess any narcotic power. In pharmacy it is used for colouring tinctures and lip salves.

COCHLEARIA.

Willd. *g.* 1228. Smith, *Flor. Brit. g.* 297. *Tetradynamia Siliculosæ.*—Nat. ord. *Siliquosæ.*

*Sp.* 1. Willd. *et* Smith. COCHLEARIA OFFICINALIS. *Dub.* Common scurvy-grass.

*Off.*—The plant.

HERBA COCHLEARIÆ. *Dub.*

THIS is an annual plant, which grows on the sea-shore of the northern countries of Europe, and is sometimes cultivated in gardens. When fresh, it has a peculiar smell, especially when bruised, and a kind of bitter acrid taste, which it loses completely by drying, but which it imparts, by distillation, to water or alcohol. It also furnishes an essential oil, the smell of which is extremely pungent.

*Medical use.*—The fresh plant is a gentle stimulant and diuretic, and is chiefly used for the cure of sea-scurvy. It may be eaten in substance, in any quantity, or the juice may be

expressed from it, or it may be infused in wine or water, or its virtues may be extracted by distillation. The juice is employed as a gargle in sore throat, and scorbutic affections of the gums and mouth.

*Sp.* 8. Willd. *p.* 4. Smith. COCHLEARIA ARMORACIA. *Ed. Lond. Dub.*

Horse-radish.

*Off.*—The root.

RADIX COCHLEARIÆ ARMORACIÆ. *Ed.*

RADIX ARMORACIÆ. *Lond.*

RADIX RAPHANI RUSTICANI. *Dub.*

HORSE-RADISH is perennial, and sometimes found about river sides, and other moist places; for medicinal and culinary uses, it is cultivated in gardens. It flowers in June, but rarely perfects its seed in this country. The root has a pungent smell, and a penetrating acrid taste; but it also contains a sweet juice, which sometimes exudes upon the surface. Both water and alcohol extract its virtues by infusion. By drying, it loses all its acrimony, becoming first sweetish, and afterwards almost insipid: if kept in a cool place, covered with sand, it retains its pungency for a considerable time.

3840 parts, according to Neumann, were reduced, by drying, to 1000, and gave of watery extract 480, and 15 of alcoholic; and inversely, 420 alcoholic, and 480 watery; all these extracts were sweetish, without pungency. About 15 of volatile oil, extremely pungent, and heavier than water, arose in distillation with water.

*Medical use.*—This root is an extremely penetrating stimulus. It excites the solids, and promotes the fluid secretions. It has frequently been of service in some kinds of scurvies, and other chronic disorders, supposed to proceed from a viscidity of the juices, or obstructions of the excretory ducts. Sydenham recommends it likewise in dropsies, particularly those which sometimes follow intermittent fevers.

COCOS BUTYRACEA. *Ed.*

*Palmæ.*—Nat. ord. *Palmæ.*

The mackaw tree.

*Off.*—The fixed oil of the nut, called Palm oil.

OLEUM FIXUM COCI BUTYRACEÆ EX NUCIBUS. *Ed.*

THIS tree is a native of South America. The fruit is triangular, yellow, and as big as a plum. The nut or kernel yields the *oleum palmæ* of the shops. It is first slightly roasted and cleaned, and then ground to a paste, first in a mill, and then

on a levigating stone. This paste is gently heated, and mixed with $\frac{3}{16}$ its weight of boiling water, put into a bag, and the oil expressed between two heated plates of iron. It yields $\frac{7}{16}$ or $\frac{8}{16}$ of oil. If coloured, this oil may be purified by filtration, when melted. It then has the consistence of butter, a golden yellow colour, the smell of violets, and a sweetish taste. When well preserved, it keeps several years without becoming rancid. When spoiled, it loses its yellow colour and pleasant smell. It is said to be often imitated with axunge, coloured with turmeric, and scented with Florentine iris root. It is rarely used in medicine, and only externally as an emollient ointment. Of late it has been imported in considerable quantity, and used in the manufacture of a toilet-soap.

Colchicum autumnale. *Ed. Lond. Dub.*
Willd. *g.* 707, *sp.* 1. Smith, *Flor. Brit. g.* 187, *sp.* 1. *Hexandria Trigynia.*—Nat. ord. *Liliaceæ.*
Meadow saffron.

*Off.*—The root in the spring, when the leaves appear.
Radix colchici autumnalis. *Ed.*
Radix colchici; radix recens. *Lond.*
Radix colchici, primo vere, foliis jam apparentibus. *Dub.*

Meadow saffron is a perennial bulbous-rooted plant, which grows in wet meadows in the temperate countries of Europe. It flowers in the beginning of autumn, at which time the old bulb begins to decay, and a new bulb to be formed. In the following May, the new bulb is perfected, and the old one wasted and corrugated. It is dug up for medical use in the beginning of summer. The sensible qualities of the fresh root are very various, according to the place of growth and season of the year. In autumn it is inert; in the beginning of summer, highly acrid. Some have found it to be a corrosive poison; others have eaten it in considerable quantity, without experiencing any effect. When it is possessed of acrimony, this is of the same nature with that of garlic, and is entirely destroyed by drying.

*Medical use.*—Stork, Collin, and Plenk, have celebrated its virtues as diuretic in hydrothorax, and other dropsies. The expressed juice is used in Alsace to destroy vermin in the hair.

It has been lately asserted, that colchicum forms the basis of the *Eau Medicinale d'Husson.* A saturated *Vinum colchici* is now frequently used as a substitute for it in gout, rheumatism, and dropsy; and there is no doubt that it produces similar and sometimes even fatal effects. It acts irregularly, but gene-

rally combines an anodyne effect with a drastic operation as an emetic, purgative, or diuretic. In some seasons or countries it seems absolutely inert. Orfila gave to dogs two or three bulbs bruised without any bad effect. It is therefore a very uncertain remedy.

RADIX COLOMBÆ. *Ed.*
RADIX CALUMBÆ. *Lond.*
RADIX COLOMBO. *Dub.*

THIS is the root of an unknown plant, which, however, is conjectured by Willdenow to be a species of bryonia. In the garden at Madras a plant of it has at last been raised from the root. As it has not yet produced female flowers, its genus has not been ascertained, but it appears to belong to the natural order of *Monospermæ.* It was erroneously supposed to have its name from a city in Ceylon, from which it is sent over all India. But we now know that it is produced in Africa, in the country of the Caffres, and that it forms an important article of commerce with the Portuguese at Mozambique, in the province of Tranquebar. It is generally brought in transverse sections, from half an inch to three inches in diameter, rarely divided across. This is evidently done to facilitate its drying; for the large pieces are all perforated with holes. The bark is wrinkled and thick, of a dark brown colour on the outside, and bright yellow within. The pith in the centre is spongy, yellowish, and slightly striped. Its smell is faintly aromatic, and readily lost when not preserved in close vessels; its taste is unpleasant, bitter, and somewhat acrid; the bark has the strongest taste; the pith is almost mucilaginous. Its essential constituents are cinchonin, and a great deal of mucilage. It is accordingly more soluble in water than in alcohol. The tincture is not precipitated by water, and does not affect the colour of infusion of turnsole, or solution of red sulphate of iron. Planche says it contains one-fourth of its weight of starch.

*Medical use.*—In India it is much used in diseases attended with bilious symptoms, particularly in cholera; and it is said to be sometimes very effectual in other cases of vomiting. It often produces excellent effects in dyspepsia. Half a drachm of the powder is given repeatedly in the day.

CONIUM MACULATUM. *Ed. Lond. Dub.*

Willd. *g.* 533, *sp.* 1. Smith, *Flor. Brit. g.* 130, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Hemlock.

*Off.*—The leaf, flower, and seed.
*a)* FOLIA CONII MACULATI. *Ed.*
FOLIA CONII. *Lond.*
FOLIA CICUTÆ. *Dub.*
*b)* SEMINA CICUTÆ nondum matura. *Dub.*

THIS is a large biennial umbelliferous plant, which grows very commonly about the sides of fields under hedges, and in moist shady places. As it may be easily confounded with other plants of the same natural order, which are either more virulent, or less active, we shall give a full description of its botanical characters. The root is white, long, of the thickness of a finger, contains, when it is young, a milky juice, and resembles both in size and form the carrot. In spring it is very poisonous, in harvest less so. The stalk is often three, four, and even six feet high, hollow, smooth, not beset with hairs, but marked with red or brown spots. The leaves are large, and have long and thick footstalks; which at the lower end assume the form of a groove, and surround the stem.—From each side of the footstalk, other footstalks arise, and from these a still smaller order, on which there are sessile, dark-green, shining, lancet-shaped, notched leafits. The umbels are terminal and compound. The flowers consist of five white heart-shaped leaves. The seeds are flat on the one side, and hemispherical on the other, with five serrated ribs. This last circumstance, with the spots on the stalks, and the peculiar very nauseous smell of the plant, somewhat resembling the urine of a cat, serve to distinguish it from all other plants. We must not be misled by its officinal name Cicuta to confound it with the Cicuta virosa of Linnæus, which is one of the most virulent plants produced in this country, and readily distinguishable from the conium, by having its hollow roots always immersed in water, which those of the conium never are. The possibility of this mistake shews the propriety of denominating all vegetables by their systematic names, as the Edinburgh college now do. The other plants which have been mistaken for the conium maculatum are, the æthusa cynapium, caucalis anthriscus, and several species of chærophyllum, especially the bulbosum, which, however, is not a native of this country.

Hemlock should not be gathered unless its peculiar smell be strong. Planche has observed, that hemlock in spring contains little vegetable albumen, while it is very abundant in the latter end of July and beginning of August, especially if the season have been warm and dry. The leaves should be collected in the month of June, when the plant is in flower. The leafits are to be picked off, and the footstalks thrown

away. The leafits are then to be dried quickly in a hot sun, or rather on tin plates before a fire, and preserved in bags of strong brown paper, or powdered and kept in close vessels, excluded from the light; for the light soon dissipates their green colour, and with it the virtues of the medicine.

*Med. use.*—Fresh hemlock contains not only the narcotic, but also the acrid principle; of the latter much, and of the former little is lost by drying. The whole plant is a virulent poison, but varying very much in strength, according to circumstances. When taken in an over-dose, it produces vertigo, dimness of sight, difficulty of speech, nausea, putrid eructations, anxiety, tremors, and paralysis of the limbs. But Dr Stoerk found, that in small doses it may be taken with great safety; and that, without at all disordering the constitution, or even producing any sensible operation, it sometimes proves a powerful remedy in many obstinate disorders. In scirrhus, the internal and external use of hemlock has been found useful, but then mercury has been generally used at the same time. In open cancer it often abates the pain, and is free from the constipating effects of opium. It is likewise used in scrofulous tumours and ulcers, and in other ill-conditioned ulcers. It is also recommended by some in chincough, and various other diseases. Its most common, and best form, is that of the powdered leaves, in the dose at first of two or three grains a-day, which in some cases has been gradually increased to upwards of two ounces a-day. An extract from the seeds is said to produce giddiness sooner than that from the leaves.

CONVOLVULUS.

Willd. *g.* 323. *Pentandria Monogynia.*—Nat. ord. *Campanaceæ.*

*Sp.* 4. CONVOLVULUS SCAMMONIA. *Ed. Lond. Dub.* Scammony.

*Off.*—The gum-resin.
GUMMI-RESINA CONVOLVULI SCAMMONIÆ. *Ed.*
GUMMI-RESINA SCAMMONEÆ. *Lond.*
SCAMMONIUM. *Dub.*

The scammony convolvulus is a climbing perennial plant, which grows in Syria, Mysia, and Cappadocia. The roots, which are very long and thick, when fresh, contain a milky juice. This is obtained by removing the earth from the upper part of the roots, and cutting off the tops obliquely. The milky juice which flows out is collected in a small vessel sunk

in the earth at the lower end of the cut. Each root furnishes only a few drachms, but the produce of several roots is added together, and dried in the sun. This is the true and unadulterated scammony. It is light, of a dark-grey colour, but becomes of a whitish yellow when touched with the wet finger, is shining in its fracture, has a peculiar nauseous smell, and bitter acrid taste, and forms with water a greenish milky fluid, without any remarkable sediment. In this state of purity it seldom reaches us, but is commonly mixed with the expressed juice of the root, and even of the stalks and leaves, and often with flour, sand, or earth. The best to be met with in the shops comes from Aleppo, in light spongy masses, having a heavy disagreeable smell, friable, and easily powdered, of a shining ash colour verging to black; when powdered, of a light grey or whitish colour. An inferior sort is brought from Smyrna in more compact ponderous pieces, with less smell, not so friable, and less easily powdered, of a darker colour, not so resinous, and full of sand and other impurities.

Resin is the principal constituent of scammony. Sixteen ounces of good Aleppo scammony give eleven ounces of resin, and three and a half of watery extract. Bouillon La Grange and Vogel obtained from 100 parts 60 of resin, 3 of gum, 2 of extract, and 35 of insoluble matter.

*Medical use.*—Scammony is an efficacious and strong purgative. Some have condemned it as unsafe and uncertain, a full dose proving sometimes ineffectual, whilst at others a much smaller dose occasions dangerous hypercatharsis. This difference, however, is owing entirely to the different circumstances of the patient, and not to any hurtful quality, or irregularity of operation, of the medicine: where the intestines are lined with an excessive load of mucus, the scammony passes through without acting upon them; but where the natural mucus is deficient, a small dose of this or any other resinous cathartic, irritates and inflames. Many have endeavoured to diminish the activity of this drug, and to correct its imaginary virulence, by exposing it to the fumes of sulphur, dissolving it in acids, and the like; but these only destroy a part of the medicine, without making any alteration in the rest. Scammony in substance, judiciously managed, stands not in need of any corrector: if triturated with sugar, or with almonds, it becomes sufficiently safe and mild in its operation. It may likewise be conveniently dissolved, by trituration, in a strong decoction of liquorice, and the solution then poured off from the fæces. The common dose of scammony is from three to twelve grains.

*Sp.* 61. CONVOLVULUS JALAPA. *Ed. Lond. Dub.*
Jalap.

*Off.*—The root.
RADIX CONVOLVULI JALAPÆ. *Ed.*
RADIX JALAPÆ. *Lond. Dub.*

JALAP is another climbing perennial species of convolvulus. It is an inhabitant of Mexico and Vera Cruz, from which it was first imported in 1710. It is now cultivated in the botanical garden of Charlestown, and even grows in the stoves at Paris. When recent, the root is white and lactescent; but it is brought to us in thin transverse slices, which are covered with a blackish wrinkled bark, and are of a dark grey colour internally, marked with darker or blackish stripes. It has a nauseous smell and taste; and when swallowed it affects the throat with a sense of heat, and occasions a plentiful discharge of saliva. When powdered it has a yellowish-grey colour.

Such pieces should be chosen as are most compact, hard, weighty, dark-coloured, and abound most with dark circular striæ and shining points; the light, whitish, friable, worm-eaten pieces must be rejected.

Slices of briony root are said to be sometimes mixed with those of jalap; but these may be easily distinguished by their whiter colour, and less compact texture.

Neumann got from 7680 parts, 2480 alcoholic, and then by water, 1200; and inversely, 2160 watery, besides 360 which precipitated during the evaporation, and 1440 alcoholic: the tincture extracted from 7680 parts gave, by precipitation with water, 1910.

M. Henry, who analyzed several of the varieties of jalap found in commerce in France, obtained the following results:

| | Extract. | Resin. | Residuum. |
|---|---|---|---|
| Jalap leger, | 75 | 60 | 270 |
| —— sain, | 140 | 48 | 210 |
| —— piqué, | 125 | 72 | 200 |

Besides the gummy extract and the resin, jalap contains amylaceous fæculum, which is preyed on by worms according to Henry, so that it is wrong to suppose that it was only the extractive which was destroyed by them. Jalap also contains several alkaline and earthy salts.

*Medical use.*—Jalap in substance, taken in a dose of about half a drachm, proves an effectual, and in general a safe, purgative, performing the office mildly, seldom occasioning nausea or gripes except in hypochondriacal disorders, and hot bilious temperaments, when it gripes violently, if the jalap be good,

but rarely takes due effect as a purge. An extract originally made by water purges almost universally, but weakly; and at the same time has a considerable effect by urine: what remains after this process gripes severely. The pure resin prepared by alcohol occasions most violent gripings, and other distressing symptoms, but scarcely proves at all cathartic; triturated with sugar, or with almonds, into the form of an emulsion, or dissolved in spirit, and mixed with syrups, it purges plentifully in a small dose, without occasioning much disorder; the part of the jalap remaining after the separation of the resin yields to water an extract, which has no effect as a cathartic, but operates powerfully by urine.

COPAIFERA OFFICINALIS. *Ed. Lond. Dub.*

Willd. *g.* 880, *sp.* 1. *Decandria Monogynia.*— Nat. ord. *Dumosæ.*

Copaiva tree.

*Officinal.*— The resin called Balsam of copaiva.

RESINA COPAIFERÆ OFFICINALIS; resina liquida. *Ed.*

COPAIBA; resina liquida. *Lond.*

BALSAMUM COPAIBÆ. *Dub.*

THE tree which produces this resin is a native of the Spanish West-India islands, and of some parts of South America. It grows to a large size, and the resinous juice flows in considerable quantities from incisions made in the trunk.

The juice is clear and transparent, of a whitish or pale yellow colour, an agreeable smell, and a bitterish pungent taste. It is usually about the consistence of oil, or a little thicker; when long kept, it becomes nearly as thick as honey, retaining its clearness: but it has not been observed to grow dry or solid, as most of the other resinous juices do. The best resin of copaiva comes from Brazil; but we sometimes meet with a thick sort, scarcely or not at all transparent, and generally having a portion of turbid watery liquor at the bottom. This is probably either adulterated by the mixture of other substances, or has been extracted by decoction from the bark and branches of the tree: its smell and taste are much less pleasant than those of the genuine resin.

Pure resin of copaiva dissolves entirely in alcohol: the solution has a very fragrant smell. Distilled with water, it yields a large quantity of a limpid essential oil, but no benzoic acid; it is therefore not a balsam, but a combination of resin and volatile oil. Neumann says that it effervesces with liquid ammonia.

*Medical use.*—The resin of copaiva is an useful corroborating detergent medicine, but in some degree irritating. It

strengthens the nervous system, tends to loosen the belly; in large doses it proves purgative, promotes urine, and is supposed to clean and heal exulcerations in the urinary passages more effectually than any of the other resinous fluids. Fuller observes that it gives the urine an intensely bitter taste, but not a violet smell, as the turpentines do.

This resin has been principally celebrated in gleets, and the fluor albus, and externally as a vulnerary.

The dose of this medicine rarely exceeds 20 or 30 drops, though some authors direct 60, or upwards. It may be conveniently taken in the form of an oleosaccharum, or in that of an emulsion, into which it may be reduced, by triturating it with almonds, with a thick mucilage of gum arabic, or with the yolk of eggs, till they are well incorporated, and then gradually adding a proper quantity of water.

CORIANDRUM SATIVUM. *Dub. Lond. Ed.*

Willd. *g.* 552, *sp.* 1. Smith, *Flor. Brit. g.* 142, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Coriander.

*Off.*—The seeds.

SEMINA CORIANDRI SATIVI. *Ed.*

SEMINA CORIANDRI. *Lond. Dub.*

CORIANDER is an annual umbelliferous plant, a native of the south of Europe, found wild about Ipswich, and in some parts of Essex, though Dr Smith does not consider it as indigenous. It differs from all other plants of its order, in producing *spherical* seeds. Their smell, when fresh, is strong and disagreeable, but by drying becomes sufficiently grateful. They are recommended as carminative and stomachic.

CROCUS SATIVUS. *Ed. Dub.* (ANGLICUS). *Lond.*

Willd. *g.* 92, *sp.* 1. Smith, *Flor. Brit. g.* 16, *sp.* 1. *Triandria Monogynia.*—Nat. ord. *Liliaceæ.*

Saffron crocus.

*Off.*—The summits of the pistils, called Saffron.

STIGMATA CROCI. *Lond.*

CROCUS; floris stigma. *Dub.*

STIGMATA CROCI SATIVI. *Ed.*

CROCUS is a bulbous-rooted perennial plant, probably a native of the East, although it is now found wild in England, and other temperate countries of Europe. It is very generally cultivated as an ornament to our gardens, and in some places for the saffron, which is formed of the dried summits of the pistil. Each flower has one pistil, the summit of which

is deeply divided into three slips, which are of a dark orange-red colour, verging to white at the base, and are smooth and shining. Their smell is pleasant and aromatic, but narcotic; their taste a fine aromatic bitter, and they immediately give a deep yellow colour to the saliva when chewed. The flowers are gathered early in the morning, just before they open; the summits of the pistils are picked out, very carefully dried by the heat of a stove, and compressed into firm cakes. The English saffron is superior to what is imported from other countries, and may be distinguished by its blades being broader. On the continent, they reckon the Austrian and the French from Gatinois the best. The Spanish is rendered useless by being dipt in oil with the intention of preserving it. Saffron should be chosen fresh, not above a year old, in close cakes, neither dry, nor yet very moist; tough and firm in tearing; difficultly pulverizable; of a fiery orange-red colour, within as well as without; of a strong, acrid, diffusive smell; and capable of colouring a very large proportion of water or alcohol. Saffron which does not colour the fingers when rubbed between them, or stains them with oil, has little smell or taste, or a musty or foreign flavour, is too tender, and has a whitish, yellow, or blackish colour, is bad. It is said, that it is sometimes adulterated with the fibres of smoked beef, and with the flowers of the carthamus tinctorius, calendula officinalis, &c. The imposition may be detected by the absence of the white ends, which may be observed in the real saffron, by the inferior colouring power, and by the want of smell, or by an unpleasant smell, when thrown on live coals.

By distillation with water, saffron furnishes a small proportion of essential oil, of a golden yellow colour, heavier than water, and possessing the characteristic smell in an eminent degree. According to Hermbstædt, the soluble matter of saffron is extractive nearly pure. Neumann obtained from 480 dried saffron, 360 grains of watery extract which was soluble in alcohol, except 24 of a colourless matter like sand, and afterwards 20 of alcoholic; and inversely, 320 of alcoholic extract entirely soluble in water, and then 90 of watery.

On account of the great volatility of the aromatic part of the saffron, it should be wrapped up in bladder, and preserved in a box or tin case.

*Medical use.*—Saffron is a very elegant aromatic: besides the virtues which it has in common with all the bodies of that class, it has been alleged that it raises the spirits, and in large doses occasions immoderate mirth, involuntary laughter, and the other effects which follow from the abuse of spiritous liquors. It is said to be particularly serviceable in hysteric de-

pressions, or obstructions of the uterine secretions, where other aromatics, even those of the more generous kind, have little effect. But the experiments of Dr Alexander, and Dr H. Cullen shew, that it is much less powerful than was once imagined, so that of late the estimation in which it was held as a medicine has been on the decline.

CROTON ELEUTHERIA. *Swartz. prod. Ed.*
CROTON CASCARILLA. *Dub. Lond.*
Willd. *g.* 1713, *sp.* 2. *Monoecia Monadelphia.*—Nat. ord. *Tricoccæ.*
Eleutheria, or Cascarilla.

*Off.*—The bark.
CORTEX CROTONIS ELEUTHERIÆ. *Ed.*
CORTEX CASCARILLÆ. *Lond. Dub.*

THIS bark is imported into Europe from the Bahama islands, and particularly from one of them of the name of Eleutheria; from which its trivial name is derived. But Dr Wright also found the tree on the sea-shore in Jamaica, where it is common, and rises to about twenty feet in height. It is the Clutia Eluteria of Linnæus: the bark of whose Croton cascarilla has none of the sensible qualities of the cascarilla of the shops.

This bark is in general imported either in curled pieces, or rolled up into short quills, about an inch in width, somewhat resembling in appearance the Peruvian bark. Its fracture is smooth, and close, of a dark brown colour. It is covered with a rough whitish epidermis; and in the inside it is of a brownish cast.

It has a light agreeable smell, and a moderately bitter taste, with some aromatic warmth. It burns readily, and yields, when burning, a very fragrant smell, resembling that of musk; a property which distinguishes the cascarilla from all other barks.

Tromsdorff got from eight ounces, 720 grains of mucilage and bitter principle; 580 of resin; 68 of volatile oil; 2520 of fibrous matter; and 48 of water. Its virtues are partially extracted by water, and totally by alcohol; but it is most effectual when given in substance.

*Medical use.*—It produces a sense of heat, and excites the action of the stomach; and it is therefore a good and pleasant stomachic, and may be employed with advantage in flatulent colics, internal hæmorrhagies, dysenteries, diarrhœas, and similar disorders.

As the essential oil is dissipated in making the extract, this preparation acts as a simple bitter. It was much employed by the Stahlians in intermittent fever, from their fear of using Cinchona bark, to which, however, it is much inferior in efficacy.

CUCUMIS COLOCYNTHIS. *Ed. Dub. Lond.*
Willd. *g.* 1741, *sp.* 1. *Monoecia Syngenesia.*—Nat. ord. *Cucurbitaceæ.*
Coloquintida, or bitter apple.

*Off.*—The medullary part of the fruit.
PULPA CUCUMERIS COLOCYNTHIDIS, ex fructu. *Ed.*
PULPA COLOCYNTHIDIS, pomorum pulpa. *Lond.*
COLOCYNTHIS, fructus medulla. *Dub.*

THIS is an annual plant of the gourd kind, a native of Turkey. The fruit is about the size of an orange; its medullary part, freed from the rind and seeds, is alone made use of in medicine; this is very light, white, spongy, composed of membranous leaves, of an extremely bitter, nauseous, acrimonious taste. It is gathered in autumn when it begins to turn yellow, and is then peeled and dried quickly, either in a stove or in the sun. In the latter case it should be covered with paper.

Neumann got from 7680 parts 1680 alcoholic extract, and then 2160 watery; and inversely, 3600 watery, and 224 alcoholic.

*Medical use.*—Colocynth is one of the most powerful and most violent cathartics. Many eminent physicians condemn it as dangerous, and even deleterious: others recommend it not only as an efficacious purgative, but likewise as alterative in obstinate chronical disorders. It is certain that colocynth, in the dose of a few grains, acts with great vehemence, disorders the body, and sometimes occasions a discharge of blood. Many attempts have been made to correct its virulence by the addition of acids, astringents, and the like: these may lessen the force of the colocynth, but not otherwise than might be equally done by a reduction of the dose. The best method of abating its virulence, without diminishing its purgative virtue, seems to be by triturating it with gummy farinaceous substances, or the oily seeds.

CUMINUM CYMINUM. *Lond.*
Willd. *g.* 547, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Umbellatæ.*
Cummin.

*Off.*—The seeds.

SEMINA CUMINI. *Lond.*

THE cummin is an annual umbelliferous plant, in appearance resembling fennel, but much smaller. It is a native of Egypt; but the seeds used in Britain are brought chiefly from Sicily and Malta. Cummin seeds have a bitterish warm taste accompanied with an aromatic flavour, not of the most agreeable kind, residing in a volatile oil.

CUPRUM. *Lond. Ed. Dub.*

Copper.

COPPER is found in many countries.

*a.* In its metallic state:

1. Crystallized.
2. Alloyed with arsenic and iron.
3. Sulphuretted.

*b.* Oxidized:

4. Uncombined.
5. Combined with carbonic acid.
6. ——————— sulphuric acid.
7. ——————— arsenic acid.

The general properties of copper have been already enumerated.

Copper has more smell and taste than almost any other metal. Its effects, when taken into the stomach, are highly deleterious, and often fatal. It particularly affects the primæ viæ, exciting excessive nausea, vomiting, colic pains, and purging, sometimes of blood, or, though more rarely, obstinate constipation. It also produces agitation of the mind, and headach; renders the pulse small and weak, the countenance pale, and causes fainting, convulsions, paralysis, and apoplexy. When any of these symptoms occur, we must endeavour to obviate the action of the poison by large and copious draughts of oily and mucilaginous liquors, or to destroy its virulence by solutions of potass, or sulphuret of potass; but according to Orfila, there is no remedy at all comparable to sugar, a discovery which we owe to Marcelin Duval, and therefore as soon as we know that a person has been poisoned by copper, he should be made to swallow sugar and syrup in large quantities.

Poisoning from copper is most commonly the effect of ignorance, accident, or carelessness; and too many examples are met with of fatal consequences ensuing from eating food which had been dressed in copper vessels not well cleaned from the rust which they had contracted by being exposed to the action of air and moisture; or pickles, to which a beautiful green colour had been given, according to the homicidial

directions of the most popular cookery books, by boiling them with halfpence, or allowing them to stand in a brass pan until a sufficient quantity of verdigris be formed.

Great care ought to be taken that acid liquors, or even water, designed for internal use, be not suffered to stand long in vessels made of copper, otherwise they will dissolve so much of the metal as will give them dangerous properties. But the sure preventive of these accidents is to banish copper utensils from the kitchen and laboratory. The presence of copper in any suspected liquor is easily detected by inserting into it a piece of polished steel, which will soon be coated with copper, or by dropping into it some carbonate of ammonia, which will produce a beautiful blue colour if any copper be present.

But although copper be thus dangerous, some preparations of it are in certain cases used with great advantage, both externally and internally.

The chief of these are,

1. The sub-acetate of copper.
2. The sulphate of copper.
3. The sub-sulphate of copper and ammonia.
4. The muriate of copper and ammonia.
5. A solution of the sulphate of copper and super-sulphate of alumina in sulphuric acid.

As the two first of these are never prepared by the apothecary, but bought by him from the manufacturer, they are inserted in the list of materia medica.

Sub-acetas cupri, v. s. Ærugo. *Ed.*
Ærugo, s. s. Sub-acetas cupri impura. *Lond.*
Ærugo, s. s. Sub-acetas cupri. *Dub.*
Sub-acetate of copper. Verdigris.

The preparation of this substance was almost confined to Montpelier in France, owing chiefly to an excellent regulation which existed, that no verdigris could be sold until it had been examined and found of sufficiently good quality. For since that regulation has been abolished, Chaptal informs us, that so many abuses have crept into the manufacture, that the Montpelier verdigris has lost its decided superiority of character. It is prepared by stratifying copper-plates with the husks and stalks of the grape, which have been made to ferment after the wine has been expressed from them. In from ten to twenty days, when the husks become white, the plates of copper are taken out, and their surfaces are found to be covered with detached and silky crystals. They are now placed on edge, with their surfaces in contact, in the corner of a cellar, and alternately dipt in water, and replaced to dry every seven

or eight days, for six or eight times. By this management the plates swell, and are every where covered with a coat of verdigris, which is easily separated with a knife. In this state it is only a paste, and is sold by the manufacturers to commissioners, who beat it well with wooden mallets, and pack it up in bags of white leather, a foot high, and ten inches wide, in which it is dried by exposing it to the air and sun, until the loaf of verdigris cannot be pierced with the point of a knife.

Sub-acetate of copper should be of a bluish green colour, dry and difficult to break, and should neither deliquesce, have a salt taste, contain any black or white spots, nor be adulterated with earth or gypsum. Its purity may be tried by diluted sulphuric acid, in which the sub-acetate dissolves entirely, and the impurities remain behind.

Verdigris, as it comes to us, is generally mingled with stalks of the grape; they may be separated, in pulverization, by discontinuing the operation, as soon as what remains seems to be almost entirely composed of them.

*Medical use.*—Verdigris is seldom or never used internally. Some writers highly extol it as an emetic, and say, that a grain or two act as soon as received into the stomach; but its use has been too often followed by dangerous consequences to allow of its employment. Verdigris, applied externally, proves a gentle detergent and escharotic, and is employed to destroy callous edges, or fungous flesh in wounds. It is also advantageously applied to scorbutic ulcers of the mouth, tongue, or fauces, and deserves to be carefully tried in cancerous sores.

SULPHAS CUPRI, v. s. Cuprum vitriolatum; vitrioleum cœruleum. *Ed.*

SULPHAS CUPRI, v. s. Vitrioleum cœruleum. *Dub.*

SULPHAS CUPRI. *Lond.*

Sulphate of copper. Blue vitriol.

THIS metallic salt is rarely formed by combining directly its component parts; but it is obtained, either by evaporating mineral waters which contain it, or by acidifying native sulphuretted copper, by exposing it to the action of air and moisture, or by burning its sulphur.

When pure it has a deep blue colour, and is crystallized generally in long rhomboids. It effloresces slightly in the air, is soluble in four parts of water at 60°, and in two at 212°, and is insoluble in alcohol. By heat it loses, first its water of crystallization, and afterwards all its acid. It is decomposed by the alkalies and earths, and some of the metals, the alkaline carbonates, borates, and phosphates, and some metallic salts.

It is composed of,

| | | |
|---|---|---|
| Copper, | 24 | |
| Oxygen, | 8 | 42 hydro-oxide of copper. |
| Water, | 10 | |
| | | 33 sulphuric acid. |
| | | 25 water of crystallization. |
| | | 100 |

*Medical use.*—The sulphate of copper has a strong, styptic, metallic taste, and is chiefly used externally as an escharotic for destroying warts, callous edges, and fungous excrescences, as a stimulant application to ill-conditioned ulcers, and as a styptic to bleeding surfaces. Taken internally, it operates, in very small doses, as a very powerful emetic. It has, however, been exhibited in incipient phthisis pulmonalis, intermittent fever, and epilepsy ; but its use is not free from danger.

DAPHNE MEZEREUM. *Ed. Lond. Dub.*

Willd. *g.* 773, *sp.* 1. Smith, *Flor. Brit. g.* 194, *sp.* 1. *Octandria Monogynia.*—Nat. ord. *Veprecul*æ.

Mezereon, spurge olive.

*Off.*—The bark of the root.

CORTEX DAPHNES MEZEREI. Ex radice. *Ed.*

CORTEX MEZEREI. Radicis cortex. *Lond. Dub.*

MEZEREON is a shrub which grows in woody situations in the northern parts of Europe, and is cultivated in our gardens as a flowering shrub. The bark, which is taken from the trunk, larger branches, and root, is thin, striped, reddish, commonly covered with a brown cuticle, has no smell, and when chewed, excites an insupportable sensation of burning in the mouth and throat. When applied to the skin in its recent state, or infused in vinegar, it raises blisters. Its acrid principle is said by M. Lartique of Bourdeaux to be soluble in ether.

*Medical use.*—The root was long used in the Lisbon diet-drink, for venereal complaints, particularly nodes, and other symptoms resisting the use of mercury. The bark of the root contains most acrimony, though some prefer the woody part. Mezereon has also been used with good effects in tumours and cutaneous eruptions not venereal.

Dr Cullen says that it acts upon the urine, sometimes giving it a filamentous appearance, and upon the perspiration, without diminishing the strength remarkably ; and that in irritable habits it quickens the pulse, and increases the heat of the whole body. But Mr Pearson of the Lock Hos-

pital asserts, that excepting a case or two of lepra, in which a decoction of this plant conferred temporary benefit, he very seldom found it possessed of medical virtues, either in syphilis, or in the sequelæ of that disease. In scrofula, or in cutaneous affections, it is employed chiefly under the form of decoction; but it has also been used in powder; and as it is apt to occasion vomiting and purging, it must be begun in grain doses, and gradually increased. It is often combined with mercury.

The berries are still more acrid than the bark, and they have even been known to produce fatal effects on children, who have been tempted by their beauty to eat them. It is said that they are sometimes infused in vinegar, to make it more pungent and appear stronger.

DATURA STRAMONIUM. *Ed. Dub.*

Willd. *g.* 377, *sp.* 1. Smith, *Flor. Brit. g.* 98, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ.*

Thorn-apple. James-town weed.

*Off.*—The plant.

HERBA DATURÆ STRAMONII. *Ed.*

HERBA STRAMONII. *Dub.*

THE thorn-apple is an annual plant, a native of America, which gradually diffused itself from the south to the north, and now even grows wild on dry hills and uncultivated places in England, and other parts of Europe. The leaves are dark green, sessile, large egg-shaped, pointed, angular, and deeply indented, of a disagreeable smell and nauseous taste. Every part of the plant is a strong narcotic poison, producing vertigo, torpor, death. Crystals of nitrate of potass shoot in the extract, as prepared by Stoerk, when it has been kept several months. Dr Barton mentions the cases of two British soldiers, who ate it by mistake, for the Chenopodium album: one became furious, and ran about like a madman, and the other died, with the symptoms of genuine tetanus. The best antidote to its effects is said to be vinegar.

*Medical use.*—Dr Stoerk first tried it as a remedy in mania and melancholy, with considerable success. Several cases of the same diseases were also cured or relieved by it, under the direction of different Swedish physicians. It has also been employed, and sometimes with advantage, in convulsive and epileptic affections. Dr Barton considers it to be a medicine of great efficacy. He gives it in powder, beginning with doses of a few grains, and increasing them, in some days, to 15 or 20. In a case, in which it was exhibited to the extent of 30 grains, it dilated the pupil of one eye, and

produced paralysis of the eye-lids, which was removed by a blister. Hufeland gave it in the form of a tincture, prepared of two ounces of the seeds in four ounces of wine, and one of diluted alcohol, in diseases of the mind. The inspissated juice of the leaves has been most commonly used; but its exhibition requires the greatest caution. At first, a quarter of a grain is a sufficient dose. An ointment prepared from the leaves has been said to give ease in external inflammations and hæmorrhoids. And the bruised leaves, according to Plenk, soften hard and inflamed tumours, and discuss tumours in the breasts of nurses, from indurated milk.

The smoke of the stramonium has been much extolled for the cure of asthma. Its use in this manner has been derived from the East Indies, where, however, other species of *datura*, the *fatuosa* and *ferox*, are employed. Dr Anderson of Madras recommended these to General Gent, who made the practice known in Britain, where the stramonium seems first to have been substituted by Mr Sills. This gentleman received so much benefit from inhaling its smoke, that he published his case in the Monthly Magazine, and recommended it very freely. According to all those who have employed it, it is the root only and lower part of the stem which is to be used. These are to be dried as quickly as possible, cut into slips, and beat so as to divide the fibres. The manner of using them is by filling the bowl of a tobacco-pipe, as with tobacco, and inhaling the smoke. The saliva excited is directed to be swallowed, but its safety I should think doubtful. Used in this way, it is however said to excite a sense of heat in the chest, followed by copious expectoration, and sometimes attended with temporary vertigo or drowsiness, and rarely nausea. It frequently gives relief when a pipe is thus smoked upon a paroxysm being threatened, or even after its commencement: the patient falls asleep, and awakes recovered from the paroxysm. In some cases, a perfect cure is effected, but more commonly the relief is only temporary. It seems however valuable as a palliative, and the direct application of the remedy to the seat of the disease is rational at least. I need scarcely caution my readers against the quack preparations said to contain stramonium.

Dr Marcet of London has published a very valuable paper on the use of stramonium, in Medic. Chirurg. Trans. vol. vii. p. 551. He used it in the form of extract, and as its activity and utility, as indeed is the case with all extracts, depend entirely on its proper preparation, I shall detail the process as described by Mr Hudson of the Hay-Market.

" One pound of the *Seeds* of Stramonium, after being well bruised, are boiled with three gallons of water down to one gallon. The decoction is strained, and the seeds are again boiled, with one gallon more of water, to two quarts. This second decoction is strained, and being mixed with the former, the whole is allowed to stand for twelve hours. The liquor is then drawn off, free from fecula and oil, and evaporated to a proper consistence, the latter part of the evaporation being performed in a water-bath. A considerable portion of oil is separated from the seeds by boiling, which is troublesome in the extract, if allowed to remain, and does not appear to add in any degree to its effect.

" The quantity of extract, yielded by one pound of seeds, is from one ounce and a half to two ounces, being liable to some variation from the state and quality of the seeds.

" An analogous extract is obtained by a process exactly similar, by substituting the *whole plant* cut into small pieces, instead of the seeds ; but in this case none of the oily matter above-mentioned appears. The proportion of extract, when prepared from the whole plant, has not been ascertained."

Dr Marcet adds, " that from the few comparative trials I have made of the two kinds of preparations, the extract obtained from the seeds has appeared to me considerably more active than that prepared from the whole plant; and the impression made upon my mind from these trials is, that the extract from the seeds is more certain in its effects than the other, and that one part of the former is at least equal in power to two parts of the latter. But though the one appears to be so much stronger than the other, I am not able to point out any other difference between the two preparations."

Dr Marcet states the result of his experience in the following sentences : " I do not by any means pretend to have yet acquired a competent knowledge of the properties of this medicine ; but if I were called upon to express, in a few words, the general opinion which I feel inclined to form from the opportunities I have had of studying them, I should say that the most common effect of stramonium, when administered in appropriate doses *, in cases of chronic disease, attended with acute pain, is to lessen powerfully, and almost immediately, sensibility and pain ; to occasion a sort of nervous shock, which is frequently attended with a momentary affection of the head and eyes, with a degree of nausea, and with phænomena resembling those that are produced by intoxication ; to excite in many instances nervous sensations, which are re-

* I mean from $\frac{1}{8}$th to 1 grain, a dose which should not be exceeded till its effects have been ascertained.

ferred to the œsophagus, or bronchia, or fauces, and which sometimes amount to a sense of suffocation; to have rather a relaxing than an astringent effect upon the bowels; to have no marked influence upon the frequency of the pulse, though in a few instances it has appeared to render it somewhat slower; to produce but a transitory and inconsiderable dilatation of the iris and pupil; and to have but little immediate tendency to induce sleep, except from the state of comparative serenity and ease, which generally follows the symptoms I have just described." Its use was first suggested to Dr Marcet by the son of Mr Norwood of Ashford, as used by his father.

DAUCUS CAROTA. *Ed. Lond. Dub.*

Willd. *g.* 530, *sp.* 1. Smith, *g.* 128, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Carrot.

*Off.*—The seeds of the wild, and root of the garden carrot.

*a)* DAUCI SYLVESTRIS SEMINA. *Dub.*
DAUCI (AGRESTIS) SEMINA. *Lond.*
*b)* DAUCI (HORTENSIS) RADIX. *Lond.*
DAUCI CAROTÆ RADIX. *Ed.*

THIS is a biennial plant, which grows wild in Britain, and is cultivated in great quantities as an article of food. The seeds, especially of the wild variety, have a moderately warm pungent taste and an agreeable aromatic smell. They are carminative, and are said to be diuretic. The roots, especially of the cultivated variety, contain much mucilaginous and saccharine matter, and are therefore highly nutritious and emollient. When beaten to a pulp, they form an excellent application to carcinomatous and ill-conditioned ulcers, allaying the pain, checking the suppuration and fetid smell, and softening the callous edges.

DELPHINIUM STAPHISAGRIA. *Lond. Dub.*

Willd. *g.* 1061, *sp.* 13. *Polyandria Trigynia.*—Nat. ord. *Multisiliquæ.*

Stavesacre.

*Off.*—The seed.

SEMINA STAPHISAGRIÆ. *Lond. Dub.*
DELPHINII STAPHISAGRIÆ SEMINA. *Ed.*

STAVESACRE is a biennial plant, a native of the south of Europe. The seeds are usually brought from Italy. They are large and rough, of an irregular triangular figure, of a blackish colour on the outside, and yellowish or whitish within; they have a disagreeable smell, and a very nauseous, bitterish burning taste.

Neumann got from 480 parts, 45 alcoholic extract, besides 90 of fixed oil, which separated during the process, and afterwards 44 insipid watery, and inversely, 95 watery, and then by alcohol only one, besides 71 of oil.

*Med. use.*—Stavesacre was employed by the ancients as a cathartic; but it operates with so much violence, both upwards and downwards, that its internal use has been for some time almost laid aside. It is chiefly employed in external applications for some kinds of cutaneous eruptions, and for destroying lice and other insects; insomuch, that from this virtue it has received its name in different languages.

Dianthus caryophillus. *Ed. Dub.*

Willd. *g.* 893, *sp.* 9. Smith, *g.* 209, *sp.* 3. *Decandria Digynia.*—Nat. ord. *Caryophyllæ.*

Clove Gillyflower. Clove pink, or carnation.

*Off.*—The flowers.

Flores dianthi caryophylli. *Ed.*

Flores rubri caryophylli. *Dub.*

This species of dianthus is perennial, and is a native of Italy, though now found wild on the walls of old castles in England. By cultivation, its varieties have increased to a very great number, and they form one of the greatest ornaments of our gardens. Most of these are termed Carnations; but the variety which is officinal surpasses all the others in the richness of its smell. It is also distinguished by being of an uniform deep crimson colour, and having the edges of its petals entire, not crenated as the others. It is now scarcely, if at all, to be found in Scotland; and, instead of it, the crimson carnations are commonly used to give the colour to the syrup, while for its flavour it is indebted to the spice clove. Their only use in pharmacy is to give a pleasant flavour and beautiful colour to an officinal syrup.

Digitalis purpurea. *Ed. Lond. Dub.*

Willd. *g.* 1155, *sp.* 1. *Didynamia Angiospermia.*—Nat. ord. *Solanaceæ.*

Foxglove.

*Off.*—The leaves.

Digitalis purpureæ folia. *Ed.*

Digitalis folia. *Lond. Dub.*

This is an indigenous biennial plant, very common on hedge-banks, and sides of hills, in dry, gravelly, or sandy soils, and the beauty of its appearance has gained it a place in our gardens and shrubberies. The leaves are large, oblong, egg-shaped, soft, covered with hairs, and serrated.

They have a bitter, very nauseous taste, with some acrimony. Destouches analysed foxglove. Four ounces of the dried leaves yielded successively 9 drachms of watery, and 78 grains of alcoholic extract. The first was brown, smooth, and of a consistence fit for making pills. The second had a very deep green colour, a virose and disagreeeble smell, the consistence of tallow, but more tenacious; did not furnish ammonia by distillation, and was not acted upon by acids. The ashes contained salts of lime and potass.

*Med. use.*—Its effects, when taken into the stomach, are,

1. To diminish the frequency of the pulse.
2. To diminish the irritability of the system.
3. To increase the action of the absorbents.
4. To increase the discharge by urine.

In excessive doses, it produces vomiting, purging, dimness of sight, vertigo, delirium, hiccough, convulsions, collapse, death. For these symptoms, the best remedies are cordials and stimulants.

Internally, digitalis has been recommended,

1. In inflammatory diseases, from its very remarkable power of diminishing the velocity of the circulation.

2. In active hæmorrhagies; in phthisis.

3. In some spasmodic affections, as in spasmodic asthma, palpitation, &c.

4. In mania from effusion on the brain.

5. In anasarcous and dropsical effusions.

6. In scrofulous tumours.

7. In aneurism of the aorta, and palpitation, I have seen it alleviate the most distressing symptoms.

Externally, it has been applied to scrofulous tumours.

It may be exhibited,

1. In substance, either by itself, or conjoined with some aromatic, or made into pills, with soap or gum ammoniac. Withering directs the leaves to be gathered after the flowering stem has shot up, and about the time when the blossoms are coming forth. He rejects the leaf-stalk, and middle rib of the leaves, and dries the remaining part, either in the sunshine, or before the fire. In this state, they are easily reduced to a beautiful green powder, of which we may give, at first, one grain twice a-day, and gradually increase the dose until it act upon the kidneys, stomach, pulse, or bowels, when its use must be laid aside, or suspended.

2. In infusion. The same author directs a drachm of the dried leaves to be infused for four hours in eight ounces of boiling water, and an ounce of any spiritous water to be add-

ed to the strained liquor, for its preservation. Half an ounce, or an ounce of this infusion, may be given twice a-day.

3. In decoction. Darwin directs that four ounces of the fresh leaves be boiled in two pounds of water, until they be reduced to one, and that half an ounce of the strained decoction be taken every two hours, for four or more doses.

4. In tincture. Put one ounce of the dried leaves, coarsely powdered, into four ounces of diluted alcohol; let the mixture stand by the fire-side twenty-four hours, frequently shaking the bottle; and the saturated tincture, as Darwin calls it, must then be separated from the residuum, by straining or decantation. Twenty drops of this tincture may be taken twice or thrice a-day. The Edinburgh college use eight ounces of diluted alcohol to one of the powder, but let it digest seven days.

5. The expressed juice and extract are not proper forms of exhibiting this very active remedy.

When the digitalis is disposed to excite looseness, opium may be advantageously conjoined with it; and when the bowels are tardy, jalap may be given at the same time, without interfering with its diuretic effects. During its operation in this way, the patient should drink very freely. Two cases of phthisis are related by Dr Gregg, in which it produced a copious ptyalism.

Dolichos pruriens. *Ed. Lond. Dub.*

Willd. *g.* 1349, *sp.* 16. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ.*

Cow-itch.

*Officinal.*—The stiff hairs which cover the pods.

Pubes dolichi prurientis, ex legumine. *Ed.*

Pubes dolichi. *Lond.*

Setæ leguminum dolichi. *Dub.*

The dolichos is a climbing plant, resembling our common scarlet runner, growing in great abundance in warm climates, particularly in the West Indies. The pods are about four inches long, round, and as thick as a man's finger. On the outside they are thickly beset with stiff brown hairs, which, when applied to the skin, occasion a most intolerable itching. In the choice of cow-itch, we must reject all those pods which are shrivelled, brown, and diminutive in size, have lain long in damp warehouses, and are musty, or of a bad colour.

*Med. use.*—The ripe pods are dipped in syrup, which is again scraped off with a knife. When the syrup is rendered by the hairs as thick as honey, it is fit for use. It acts mechanically as an anthelmintic, occasions no uneasiness in the

primæ viæ, and may be safely taken, from a tea-spoonful to a table spoonful in the morning, fasting. The worms are said to appear with the second or third dose; and by means of a purge, in some cases the stools have consisted entirely of worms. For further information, the publications of Mr Chamberlayne may be consulted.

DORSTENIA CONTRAJERVA. *Ed. Lond.*

Willd. *g.* 244, *sp.* 5. *Tetandria Monogynia.*—Nat. ord. *Scabridæ.*

Contrayerva.

*Officinal*—The root.

RADIX DORSTENIÆ CONTRAJERVÆ. *Ed.*

RADIX CONTRAJERVÆ. *Lond.*

THIS plant is perennial, and grows in South America, and some of the Caribæan islands.

The root is knotty, an inch or two long, and about half an inch thick, of a reddish brown colour externally, and pale within: long, rough, slender fibres shoot out from all sides of it, and are generally loaded with small brown knots. It has a peculiar kind of aromatic smell, and a somewhat astringent, warm, bitterish taste, with a light and sweetish kind of acrimony, when long chewed: the fibres have little taste or smell; the tuberous part, therefore, should be alone chosen.

This root contains so much mucilage, that a decoction of it will not pass through the filter. Neumann got from 480 parts, 190 watery extract, and afterwards 7 alcoholic, and inversely, 102 alcoholic, and 60 watery. I find that the tincture reddens infusion of litmus, is precipitated by water, and has no effect on the salts of iron.

*Medical use.*—Contrayerva is a gentle stimulant and a diaphoretic, and is sometimes given in exanthematous diseases, typhus, and dysentery. Its dose is about half a drachm.

ERYNGIUM MARITIMUM. *Dub.*

Willd. *g.* 518, *sp.* 6. Smith, *g.* 121, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Umbellatæ.*

Sea-eryngo. Sea-holly.

*Officinal.*—The root.

RADIX ERYNGII. *Dub.*

THIS plant grows plentifully on some of our sandy and gravelly shores. It is perennial, and flowers in July and August. The roots are slender and very long; of a pleasant sweetish taste, which, on chewing them for some time, is followed by a light degree of aromatic warmth and acrimony. They are accounted aperient and diuretic, and have also been celebra-

ted as aphrodisiac; their virtues, however, are too weak to admit them under the head of medicines.

EUGENIA CARYOPHYLLATA. *Dub. Lond.*
Willd. *g.* 972, *sp.* 24. *Icosandria Monogynia.*—Nat. ord. *Hesperideæ.*
The clove tree.

*Officinal.*—The calyx, flower-bud and its essential oil.

*a)* FLORES EUGENIÆ CARYOPHYLLATÆ. Flores nondum expliciti. *Ed.*
CARYOPHYLLI. Flores nondum expliciti siccati. *Lond.*
CALYX CARYOPHYLLI AROMATICÆ. *Dub.*

*b)* OLEUM VOLATILE EUGENIÆ CARYOPHYLLATÆ. Ex floribus nondum explicitis. *Ed.*
OLEUM CARYOPHYLLORUM. Eorum oleum essentiale. *Lond.*
OLEUM ESSENTIALE CARYOPHYLLI AROMATICÆ. *Dub.*

THIS is a beautiful tall tree, a native of the Molucca islands. The Dutch, from a desire of monopolizing the valuable spice produced by it, destroyed all the trees except in Amboyna, where it is carefully cultivated. But their scheme has been frustrated, and the clove is now thriving in the isle of France and other places. Every part of this tree is highly aromatic, especially the leaf-stalk. Cloves are the flower-buds, which are gathered in October and November, before they open, and when they are still green, and are dried in the sun, after having been exposed to smoke for some days.

Cloves have somewhat the form of a nail, consisting of a globular head, formed of the four petals of the corolla, and four leaves of the calyx not yet expanded; (but this part is often wanting, being easily broken off,) and a germen situated below, nearly cylindrical, but somewhat narrower towards the bottom, scarcely an inch in length, and covered with another thicker calyx, divided above into four parts. Their colour should be of a deep brown, their smell strong, peculiar, and grateful; their taste acrid, aromatic, and permanent. The best cloves are also large, heavy, brittle, and when pressed with the nail, exude a little oil. When light, soft, wrinkled, dirty, pale, and without smell or taste, they are to be rejected.

The Dutch, from whom we had this spice, frequently mixed it with cloves from which the oil has been distilled, and the fraud may be continued. These, though in time they regain from the others a considerable share both of taste and smell, are easily distinguishable by their weaker flavour and lighter colour.

Cloves yield by distillation with water about one-seventh of their weight of volatile oil; 960 parts also gave to Neumann 380 of a nauseous, somewhat astringent, watery extract. The same quantity gave only 300 of excessively fiery alcoholic extract. When the alcoholic extract is freed from the volatile oil by distillation with water, the oil that arises proves mild, and the resin that remains insipid. Its pungency therefore seems to depend on the combination of these principles. The Dutch oil of cloves is extremely hot and fiery, and of a reddish brown colour, but it is greatly adulterated, both with fixed oils and resin of cloves; for the genuine oil, when recently distilled, is comparatively quite mild and colourless, although it gradually acquires a yellow colour. It is heavier than water, and rises in distillation with some difficulty, so that it is proper to use a very low-headed still, and to return the distilled water several times upon the residuum.

Vauquelin obtained from the leaves of the *Agathophyllum ravensara* an essential oil absolutely the same with oil of cloves in respect to colour, taste, smell, and gravity, being heavier than water. It was only somewhat less limpid, owing, probably, to the leaves having been long kept, and the oil in consequence resinified.

*Medical use.*—Cloves, considered as a medicine, are very hot stimulating aromatics, and possess in an eminent degree the general virtues of substances of this class.

EUPHORBIA OFFICINARUM. *Lond.*

Willd. *g.* 959, *sp.* 7. *Dodecandria Trigynia.*—Nat. ord. *Tricoccæ.*

Officinal euphorbia.

*Officinal*—The gum-resin.

GUMMI RESINA EUPHORBIÆ. *Lond.*

THE London College have restored this drastic and corrosive substance to their list of officinals. It is produced from several species of the African genus Euphorbia; such as the *E. officinarum* of the Cape of Good Hope, the *E. antiquorum* which grows in Egypt, Arabia, and the East Indies, and which is said to have furnished the Euphorbium of the ancients, and the *E. Canariensis.* Mr Jackson, in his account of Morocco, has described it, but unfortunately not in the language of science. *Furbiune*, he says, is the Arabic name of this gum, which is produced by a very curious succulent plant, growing on the Atlas mountains, and called by the Shellahs and Arabs *Dergmuse.* From the main body of the plant, proceed several solid leafless branches, about three inches in circumference and one in diameter, from the top of which shoot out smaller

ones, each bearing on its summit a vivid crimson flower; these branches are scolloped, and have on their outer side small knots, from which grow five extremely sharp-pointed thorns, about one-third of an inch in length. The stalk is at first soft and succulent, but becomes hard in a few years, when the plant assumes the above-mentioned form, and may then be considered as at its maturity. The inhabitants of the lower regions of Atlas make incisions in the branches of the plant with a knife, from which a corrosive lacteous juice issues, which, after being heated by the sun, becomes a substance of a whitish yellow colour, and in the month of September drops off, and forms the gum Euphorbium. The plants produce abundantly only once in four years; but this fourth year's produce is more than all Europe can consume; for, being a very powerful cathartic, it is there little used. The people who collect the gum are obliged to tie a cloth over their mouth and nostrils, to prevent the small dusty particles from annoying them, as they produce incessant sneezing. The branches are used in the tanning of Morocco leather, and it is in great request among the women as a *depilatory*.

The gum is brought to us immediately from Barbary, in drops of an irregular form; some of which, on being broken, are found to contain little thorns, small twigs, flowers, and other vegetable matters; others are hollow, without any thing in their cavity; the tears, in general, are of a pale yellow colour externally, but somewhat white within: they break easily between the fingers. Braconnot has analysed euphorbium. He got from 100 parts, 37 of resin, 19 of wax, 20.5 of malate of lime, 2 of malate of potass, 13.5 of woody matter, 5 of water, and there was 3 of loss. Euphorbium is extremely troublesome to pulverize; the finer part of the powder, which flies off, affecting the head in a violent manner. The acrimony of this substance is so great, as to render it unfit for internal use: It burns with an agreeable smell and a bright flame.—When applied to the tongue, it seems at first to have no taste, but on being held some time in the mouth, it excites a very violent biting and burning; which lasts a long time, and cannot be abated by washing out the mouth.

Ferrum. *Lond. Dub. Ed.*
Iron.

This is the most common of all metals. It seems even to be a constituent of organic substances, and is the only metal which, when taken into the body, exerts no deleterious action upon it. The numerous ores of iron which are found in every part of the globe may be reduced to the following genera.

1. Native iron. Immense isolated masses of this have been found in Siberia and in South America. Their origin is still perfectly problematical.

2. Carburetted iron. Plumbago.
3. Sulphuretted iron. Pyrites.
4. Oxidized iron.
   *a.* Protoxide. Magnetic iron ore; colour black or grey.
   *b.* Peroxide. Not magnetic; colour red or brown.
   *c.* Carbonated.
   *d.* Arseniated.
   *e.* Tungstated.

The properties of iron, when obtained from any of these ores by the usual processes of fusion, &c. have been already described. As its mechanical division is extremely difficult, it is directed to be kept in the shops in the state of filings or wire, and the scales of black oxide, which are found around the smith's anvil. Soft malleable iron is the only kind fit for internal use, as steel and cast-iron always contain impurities, and often arsenic.

Iron is prescribed,

I. In its metallic state.
   *a.* Limatura ferri. *Ed.*
   ———— purificata. *Ed.*
   Ramenta ferri. *Lond.*
   Scobs ferri. *Dub.*
   *b.* Fila ferri. *Lond. Ed.*

II. Oxidized.
   1. Protoxide,
      *a.* Oxidum ferri nigrum. *Ed.*
      Squamæ oxydi ferri. *Dub.*
      *b.* Oxidum ferri nigrum purificatum. *Ed.*
      Oxydum ferri nigrum. *Dub.*
   2. Peroxide,
      Oxidum ferri rubrum. *Ed. Dub.*
   3. Sulphuretted,
      Sulphuretum ferri. *Ed.*
   4. Supercarbonated; as in the chalybeate mineral waters.
   5. Carbonated,
      *a.* Subcarbonas ferri præparatus. *Ed.*
      Rubigo ferri. *Dub.*
      *b.* Carbonas ferri præcipitatus. *Ed.*
      Carbonas ferri. *Lond. Dub.*
   6. Sulphated,
      Sulphas ferri. *Ed. Lond. Dub.*

7. Subsulphated,
   Sulphas ferri exsiccatus. *Ed. Dub.*
8. Muriated,
   *a*. Tinctura muriatis ferri. *Ed. Lond. Dub.*
   *b*. Tinctura muriatis ferri cum oxydo rubro. *Dub.*
9. With muriate of ammonia,
   Murias ammoniæ et ferri. *Ed. Dub.*
   Ferrum ammoniatum. *Lond.*
   Tinctura ferri ammoniati. *Lond.*
10. With nitrate of potass,
   Liquor ferri alkalini. *Lond.*
11. Acetated,
   Acetas ferri. *Dub.*
   Tinctura acetatis ferri. *Dub.*
   Tinctura acetatis ferri cum alcohol. *Dub.*
12. With tartrate of potass,
   Ferrum tartarizatum. *Lond.*
   Tartras potassae et ferri. *Ed.*
   Tartarum ferri. *Dub.*
   Vinum ferri. *Dub.*

FERRUM, s. s. Ferri ramenta et fila. *Lond.*
FILA FERRI. *Ed.*
LIMATURA FERRI. *Ed.*
SCOBS FERRI. *Dub.*
Iron. Iron-filings. Iron-wire.

*Medical use.*—The general virtues of this metal, and the several preparations of it, are, to constringe the fibres, to quicken the circulation, to promote the different secretions in the remoter parts, and at the same time to repress inordinate discharges in the intestinal tube. By the use of chalybeates, the pulse is very sensibly raised ; the colour of the face, though before pale, changes to a florid red ; the alvine, urinary, and cuticular excretions, are increased. Fetid eructations, and black coloured fæces, are marks of their taking due effect.

When given improperly, or to excess, iron produces headach and anxiety, heats the body, and often causes hæmorrhagies, or even vomiting, pains in the stomach, and spasms and pains of the bowels.

Iron is given in most cases of debility and relaxation.

1. In passive hæmorrhagies.
2. In dyspepsia, hysteria, and chlorosis.
3. In most of the cachexiæ, and it has been lately recommended as a specific in cancer.
4. In general debility produced by disease, or excessive hæmorrhage.

Where either a preternatural discharge, or suppression of natural secretions, proceeds from a langour and sluggishness of the fluids, and weakness of the solids, this metal, by increasing the motion of the former, and the strength of the latter, will suppress the flux, or remove the suppression; but where the circulation is already too quick, the solids too tense and rigid, where there is any stricture or spasmodic contraction of the vessels, iron and all its preparations will aggravate both distempers.

Iron probably has no action on the body when taken into the stomach, unless it be oxidized. But during its oxidizement, hydrogen gas is evolved; and, accordingly, we find that fetid eructations are considered as a proof of the medicine having taken effect. It can only be exhibited internally in the state of filings, which may be given in doses of from five to twenty grains, either in the form of powder, with some aromatic, or made into an electuary or bolus or pills with any bitter extract. Iron-wire is to be preferred for pharmaceutical preparations, both because it is the most convenient form, and because it is always made of the purest iron.

NIGRUM OXIDUM FERRI. *Ed.*
OXYDI SQUAMÆ FERRI. *Dub.*
The scales of iron. The scales of the oxide.

WHEN iron is heated to redness in the smith's forge, to render it more malleable, its surface becomes oxidized by the action of the atmospheric air; and as the oxide formed does not adhere to the iron, it is easily separated by percussion on the anvil, and flies off in the state of sparks, which, when cool, constitute the scales of iron. In these the iron is oxidized to that degree in which it is soluble in acids, without the production of hydrogen gas; therefore, when taken into the stomach, they do not produce the distention and flatulence occasioned by the use of the filings.

SULPHAS FERRI. *Dub. Ed. Lond.*
Sulphate of iron. Green vitriol. Copperas.

THE sulphate of iron of commerce is commonly obtained by the spontaneous oxidizement of sulphuretted iron, and subsequent lixiviation and crystallization. It is never pure, and often contains zinc or copper. The copper may be separated by adding some metallic iron to the solution; but we have no means of separating the zinc; therefore, in order to obtain it in a state of purity, we must prepare it by dissolving iron in diluted sulphuric acid. Its crystals are transparent rhomboidal prisms, of a fine green colour. They are soluble in two

parts of cold, and in less than their own weight of boiling water. They are insoluble in alcohol.

They are composed of

| | | | |
|---|---|---|---|
| Black oxide of iron, | 28 | 36 | Green hydro-oxide of iron. |
| Water of composition | 8 | | |
| | | 26 | Sulphuric acid. |
| | | 38 | Water of crystallization. |
| | | 100 | |

Green sulphate of iron is decomposed by all the earths and alkalies, and by those salts whose base forms an insoluble compound with sulphuric acid. It is also decomposed by exposure to the air, especially when in solution, and by all substances which part readily with their oxygen. The oxide of iron absorbs oxygen, and passes to the state of red oxyde, which forms a red sulphate, possessing properties very different from those of the green sulphate.

Taken internally, the green sulphate is apt to excite pain in the stomach, and spasms in the bowels; and in large doses it causes vomiting. In small doses, however, of from one to three grains, it is sometimes given as a tonic, astringent, or anthelmintic.

FERULA ASSAFŒTIDA. *Ed. Lond. Dub.*

Willd. *g.* 539, *sp.* 11.—*Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Assa fœtida.

*Officinal*—The gum-resin.

GUMMI RESINA FERULÆ ASSÆ FŒTIDÆ. *Ed.*

GUMMI RESINA ASSAFŒTIDÆ. *Lond.*

ASSAFŒTIDA. *Dub.*

THE plant which furnishes assa fœtida is perennial, and a native of the south of Persia. The gum-resin is procured from the roots of plants which are at least four years old. When the leaves begin to decay, the stalk is twisted off, and the earth removed from about their large tapering roots. The top of the root is some time afterwards cut off transversely; and in forty-eight hours, the juice which has exuded is scraped off, and a second transverse section is made. This operation is repeated until the root be entirely exhausted of juice. After being scraped off, the juice is exposed to the sun to harden.

It is brought to us in large irregular masses, composed of

various little shining lumps or grains, which are partly of a whitish colour, partly reddish, and partly of a violet hue. Those masses are accounted the best which are clear, of a pale reddish colour, and variegated with a great number of elegant white tears.

This drug has a strong fetid smell, somewhat like that of garlic; and a bitter, acrid, biting taste. It loses some of its smell and strength by keeping, a circumstance to be particularly regarded in its exhibition.

Neumann got from 1920 parts 1350 alcoholic extract and afterwards 190 watery; and inversely, 550 watery, and also 60 grains of volatile oil, in which the smell resides entirely. Tromsdorff got from four ounces 33 grains of volatile oil, lighter than water, 20 of heavy oil, 7 drachms 12 grains of bright brown resin, and 2 ounces 4 drachms of brown bitter extract of a nauseous and slightly alliaceous taste, which rises in distillation both with alcohol and water.

The seeds of a congenerous species growing in the north of Persia, the *Ferula Persica*, sent by Dr Guthrie of St Petersburgh to Dr Hope, vegetated and even produced fertile seeds at Edinburgh.

*Medical use.*—It is the most powerful of all the fetid gums, and is a most valuable remedy. It acts as a stimulant, antispasmodic, expectorant, emmenagogue, and anthelmintic. Its action is quick and penetrating.

It is often serviceable,

1. In spasmodic croup.
2. In dyspepsia, amenorrhœa, and chlorosis.
3. In asthma, dyspnœa, and hysteria.
4. In tympanites and worms.

It is exhibited,

1. In substance, in the form of pills; in doses of from five to twenty grains, either alone, or combined with bitter extracts or purgatives.
2. Dissolved in some simple distilled water.
3. Dissolved in alcohol.
4. In the form of clyster, to the extent of about two drachms.

Ficus carica. *Ed. Lond. Dub.*

Willd. *g.* 1931, *sp.* 1. *Polygamia Diœcia.*—Nat. ord. *Scabridæ.*

The fig-tree.

*Off.*—The preserved fruit.

Fructus ficus caricæ. Fructus siccatus. *Ed.*

Fructus caricæ. *Dub.* Fructus conditus. *Lond.*

This tree is probably a native of Asia, but grows plentifully in the south of Europe. The fresh fruit is very pulpy, but when dried is easily preserved without any other preparation, which the explanation of the London College, *conditus*, would imply. To this country figs are chiefly brought from the Levant. They consist almost entirely of sugar and mucilage, and are therefore demulcent. They also form a very convenient suppurating cataplasm, either roasted or boiled, and applied as hot as can be borne to parts where other cataplasms cannot easily be kept applied.

Fucus vesiculosus. *Lond. Dub.*
Murray, *g.* 1205, *sp.* 8.—Nat. ord. *Algæ.*
*Off.*—Yellow bladder wrack.
Fucus. *Lond.*
Quercus marina, herba fructibus præsentibus. *Dub.*

This is one of the most common sea-weeds found on our shores. Its value in the manufacture of kelp is well known. In medicine it is little used; though Dr Russel recommended the mucus of the vesicles as a resolvant, when applied externally to scrofulous swellings. The charcoal obtained by burning it in close vessels has in some places got the name of Æthiops vegetabilis. It is to be considered as a compound of charcoal and carbonate of soda.

Galla, ex variis quercus speciebus. *Ed.*
Gallæ, Cynipidum nidi. *Dub.*
Galla, Cynipis quercusfolii nidus. *Lond.*
Nutgalls, the nest of the cynips quercusfolii.

Olivier has, in his travels in the Ottoman Empire, given us an accurate botanical description of the oak which produces the nut-gall, and which, he says, was till then unknown to botanists. He calls it *Quercus infectoria*, and characterizes it *foliis ovato oblongis, sinuato dentatis, glaberrimis, deciduis; fructibus sessilibus, longissimis.* It is scattered through all Asia Minor, from the Bosphorus to Syria, and from the shore of the Archipelago to the frontiers of Persia. It has a crooked stem, and seldom reaches the height of six feet. It oftener has the appearance of a shrub than of a little tree. The gall-nuts come at the shoots of the young boughs, and are produced by the puncture of *diplolepsis gallæ tinctoriæ* to deposite an egg. They acquire from four to twelve lines in diameter, and are generally round and covered with tuberosities. They are in perfection when they have acquired their full size and weight, but before the insect has pierced them, after which

they get a brighter colour, and lose some of their weight. The harvest takes place about the middle of *Messidor*. The galls first picked are laid apart, and are known under the name of *Yorli*, and in commerce are called *Black* and *Green* galls. Those gathered later are called *White* galls, and are very inferior in value. In commerce they occur of different sizes, smooth or knotty on the surface, of a whitish, reddish, or blackish colour, and generally penetrated with a small hole. Internally they consist of a spongy, but hard, more or less brown substance, and they have a very rough astringent taste. Good galls are of a blackish grey, or yellow colour, heavy, and tuberculated on the surface. They are the most powerful astringents we possess; and since the discovery of the tanning principle by Mr Seguin, have very much engaged the attention of chemists. Neumann got from 960 grains of coarsely powdered galls 840 watery extract, and afterwards only 4 alcoholic; and inversely, 760 alcoholic, and 80 watery. But the most minute analysis is that of Sir H. Davy, who found that 500 grains of good Aleppo galls gave, by lixiviating them until their soluble matters were taken up, and evaporating the solution slowly, 185 grains of solid matter, which, when examined by analysis, appeared to consist of,

| | |
|---|---|
| Tannin, - - - | 130 |
| Mucilage, and matter rendered insoluble by evaporation, - - - | 12 |
| Gallic acid, and a little extractive matter, | 31 |
| Remainder, calcareous earth and saline matter, | 12 |

From my experiments, I am disposed to think that Sir H. Davy has under-rated the tannin of nut-galls; for by simple repeated infusions in hot water, the residuum of 500 grains in one experiment amounted only to 158, and in another only to 136 grains. The quantity of tannin, estimated in Sir H. Davy's way, amounted in the first to 220 grains, and in the second to 256. The great difference in these results from Sir H. Davy's must be entirely ascribed to some differences in the galls themselves, or in the mode of operation. A saturated decoction of galls, on cooling, deposites a copious pale yellow precipitate, which seems to be purer tannin than what can be got by any other process; but it still requires and deserves a more minute examination. In my experiments, a very weak infusion of nut-galls was precipitated by sulphuric acid, lime-water, sub-carbonate of potass, acetate of lead, sulphate of copper, nitrate of silver, sulphate of iron, tartrate of antimony, nitrate of mercury, infusion of officinal cinchona, and solution of gelatine; it was not precipitated by nitrous acid, ammonia, sul-

phate of zinc, muriate of mercury, infusion of quassia, or infusion of saffron. To what principles these precipitates are owing remains still to be ascertained. Vauquelin justly observes, that the infusions of nut-galls and of cinchona agree in precipitating both gelatine and tartrate of antimony, but that they precipitate each other. Another fact equally curious occurred in my experiments: a mutually saturated mixture of the infusions of nut-galls and cinchona still precipitates gelatine; but these infusions, separately saturated by gelatine, do not act on each other. Hence it appears, that the action of these infusions on each other depends on principles contained in each, compatible with the presence of tannin, but re-acting on each other, and that gelatine precipitates these principles along with the tannin. Sir H. Davy has concluded that tannin and gelatine unite in fixed proportions, viz. 46 of tannin with 54 gelatine: were this correct, it would very much facilitate the analysis of astringents, but unfortunately my experiments do not confirm it. A twelve hours' infusion of 500 grains of nut-galls in twelve ounces of water, precipitated successively with equal quantities of solution of gelatine, containing each twenty-four grains, gave precipitates weighing 98, 64, 48, and 36 grains: hence, if we suppose the whole gelatine used to be contained in each precipitate, these consisted of 24 grains of gelatine, and 74, 40, 24, and 12 grains of tannin; so that, from the weight of the precipitate alone, we cannot estimate the tannin. Dr Bostock has drawn the same conclusions from a set of experiments which he made, without any knowledge of mine. It has been generally asserted, that the precipitate of tannin and gelatine is insoluble in water, either cold or hot; but I find that in boiling water it not only becomes soft and viscid, but a certain portion is dissolved, which separates again when the solution cools. I may also remark, that if the precipitate be dried without any heat, it has a yellowish-white appearance, opaque, and without lustre; but if exposed to a very moderate increase of temperature before it be dry, it seems to undergo a kind of fusion, and acquires transparency, a dark brown-red colour, and a resinous lustre; with a higher temperature, even when almost dry, it will become so fluid as to pass through filtering paper. Sir H. Davy discovered that it is soluble in excess of gelatine. It is also extremely soluble in ammonia, forming a red solution.

*Medical use.*—An infusion or decoction of galls may be used with advantage as an astringent gargle; and an ointment of one part of finely powdered galls to eight of any simple ointment is applied with success in hæmorrhoidal affections.

Gambogia. Gummi resina ex Stalagmitide Cambogioide et quibusdam aliis arboribus. *Ed.*

Gambogia. Gummi resina Stalagmitidis Cambogioidis. *Dub.*

Cambogia. Gummi resina Stalagmitidis Cambogioidis. *Lond.*

Gamboge; a gum-resin obtained from the Stalagmitis Cambogioides and some other trees.

The tree which furnishes the gamboge is of middling size, and grows wild in the kingdom of Siam and in Ceylon. Its systematic reference is, Willd. *g.* 1888, *sp.* 1. *Polygamia Monoecia.*—Nat. ord. *Tricoccæ.* In Siam the gum-resin is obtained in drops by breaking the leaves and young shoots; hence probably its name Gummi-guttæ; but in Ceylon it is extracted from the wood of the tree in the form of a juice, which soon becomes solid. Gamboge, or at least a very similar substance, is also got in the same way from different species of Garcinia, especially the Gambogia, (the Gambogia Gutta of Lin.) Willd. *g.* 938, *sp.* 3. *Dodecandria Monogynia*, and from different species of Hypericum, especially the Bacciferum. It is brought from the East Indies in large cakes or rolls. The best sort has a deep yellow or orange colour, shining fracture, and is free from impurities. It has no smell, and very little taste, unless kept in the mouth for some time, when it impresses a slight sense of acrimony. Neumann got from 16 ounces, 14 of alcoholic extract, and one of watery; and inversely, 13 of watery, and 2 of alcoholic. He also found it almost entirely soluble in water, impregnated with a moderate proportion of fixed alkaline salt. According to my experiments, which confirm these observations, the watery solution is opaque and yellow. With alcohol it forms a transparent solution of a bright golden colour; and the residuum is totally soluble in water. The alcoholic solution is decomposed by water, becoming yellow and opaque; but the precipitate remains long suspended, and cannot be separated by common filtering paper. Ammoniated alcohol dissolves gamboge with similar phenomena. Gamboge is readily soluble in solution of potass, acquiring a bright red colour the moment it is thrown into it, and forming a dark-coloured solution, which is not decomposed by water; but the addition of any acid immediately produces a copious yellow precipitate, very soluble in excess of acid. Gamboge is also dissolved by acids, but at the same time a mutual decomposition takes place. The acid solution is precipitated by water.

Bracconot says it consists of one-fifth of gum, and four-fifths of an acidiferous resin, from which he extracted, by analysis, 22.5 dry muriatic acid, 35 charcoal, 42 gases. This requires to be confirmed.

*Medical use.*—Gamboge evacuates powerfully both upwards and downwards; some condemn it as acting with too great violence, and occasioning dangerous hypercatharsis; while others are of a contrary opinion. Geoffroy seems particularly fond of this medicine, and informs us, that he has frequently given from two to four grains, without its proving at all emetic; that from four to eight grains both vomit and purge without violence; that its operation is soon over; and that, if given in a liquid form, and sufficiently diluted, it does not need any corrector; that in the form of a bolus or pill it is most apt to prove emetic, but very rarely has this effect if joined along with *calomel.* He nevertheless cautions against its use where the patients cannot easily bear vomiting.

It has been used in dropsy with cream of tartar or jalap, or both, to quicken their operation. It is also recommended by some to the extent of fifteen grains, with an equal quantity of vegetable alkali, in cases of the tape-worm. This dose is ordered in the morning; and if the worm is not expelled in two or three hours, it is repeated even to the third time with safety and efficacy. It is asserted, that it has been given to this extent even in delicate habits.

It is an ingredient, and probably the active one, in most of the nostrums for expelling tæniæ.

Gentiana lutea. *Ed. Lond. Dub.*

Willd. *g.* 512, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Rotaceæ.*

Gentian.

*Off.*—The root.

Radix gentianæ luteæ. *Ed.*

Radix gentianæ. *Lond. Dub.*

Gentian is a perennial plant which grows upon the Alps, Pyrenees, Appennines, and other mountainous situations in the temperate parts of Europe.

The roots are long, thick, externally of a brown colour, and wrinkled: internally spongy, and of a yellow colour, without any remarkable smell, but surpassing in bitterness all other European vegetables. Alcohol dissolves only the bitter extractive, water both the extractive and mucilage.

Neumann got from 960 grains 390 alcoholic, and after-

wards 210 insipid watery extract; and inversely, 540 watery, and only 20 alcoholic.

*Medical use.*—Gentian possesses the general virtues of bitters in an eminent degree, and it is totally devoid of astringency. On dead animal matter it acts as an antiseptic. Taken into the stomach, it proves a powerful tonic, and in large doses it evacuates the intestines. It is useful in debility of the stomach, in general debility, and in gout. Combined with astringents, it cures intermittents. Externally, it is applied to putrid ulcers.

GEOFFROYA INERMIS. *Dub.* Geoffræa inermis. *Ed.*

Willd. *g.* 1362, *sp.* 3. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ.*

Cabbage-tree.

*Off.*—The bark.

CORTEX GEOFFRÆÆ INERMIS. *Ed.*

CORTEX GEOFFRŒÆ. *Dub.*

THE bark of this tree, which grows in the low savannahs of Jamaica, is of a grey colour externally, but black and furrowed on the inside. The powder looks like jalap, but is not so heavy. It has a mucilaginous and sweetish taste, and a disagreeable smell.

*Medical use.*—Its medical effects are much greater than its sensible qualities would lead us to expect. When properly exhibited, it operates as a powerful anthelmintic, especially in cases of lumbrici. It is given in form of powder, decoction, syrup, and extract, but should always be given in small doses. The decoction is preferred; and is made by slowly boiling an ounce of the fresh dried bark in a quart of water, till it assume the colour of Madeira wine. This sweetened is the syrup; evaporated it forms an extract. It commonly produces some sickness and purging; sometimes violent effects, as vomiting, delirium and fever. These last are said to be owing to an over-dose, or to drinking cold water; and are relieved by the use of warm water, castor oil, or a vegetable acid.

GEUM URBANUM. *Dub.*

Willd. *g.* 1002, *sp.* 3. Smith, *g.* 237, *sp.* 1. *Icosandria Polygynia.*—Nat. ord. *Senticosæ.*

Common avens. Herb Bennet.

*Off.*—The root.

RADIX GEI URBANI. *Dub.*

AVENS is a common perennial plant in shady uncultivated places, and flowers from May to August. The root is fibrous, externally of a dark red colour, internally white, and has the

flavour of cloves, with a bitterish astringent taste. Its virtues are said to be increased by cultivation, and the large roots are preferred to the smaller fibres. It must be dug up in spring, when the leaves begin to appear, for the smell is then strongest; indeed, it is hardly to be perceived when it flowers. It must be dried in the air, but not with a strong heat, as its flavour would be dissipated, and its virtues diminished. It tinges both water and alcohol red. Half an ounce yielded 30 grains of resinous, and 20 of gummy extract; the former had the smell of the root, the latter was without smell, and merely astringent. Water distilled from it has a pleasant flavour, and carries over a little thickish essential oil. It has been more recently analyzed by Melandri and Moretti, who got from two ounces 118 grains of tannin, 181 extractive, 61 of saponaceous extract and saline matter, 92 of mucous extract, 23 of resin, 496 of woody fibres, and 76 of volatile oil, water and loss.

*Medical use.*—Avens is an old febrifuge mentioned by Ray, but again brought into notice by Buckhave. It is recommended as a substitute for cinchona, in intermittent fevers, dysentery, and chronic diarrhœas, flatulent colic, affections of the primæ viæ, asthmatic symptoms and cases of debility. Half a drachm or a drachm of the powder may be given four times a-day, simply, or made up into an electuary with honey or rhubarb. Two table spoonfuls of the decoction may be given every hour, or a table spoonful of a tincture, made with an ounce of the root to a pound of alcohol, three or four times a-day. As an indigenous remedy it deserves notice.

GLYCYRRHIZA GLABRA. *Ed. Lond. Dub.*

Willd. *g.* 1366, *sp.* 4. *Diadelphia Decandria.* Nat. ord. *Papilionaceæ.*

Liquorice.

*Off.*—The root and the extract.

*a)* RADIX GLYCYRRHIZÆ GLABRÆ. *Ed.*

RADIX GLYCYRRHIZÆ. *Lond. Dub.*

*b)* EXTRACTUM GLYCYRRHIZÆ GLABRÆ. *Ed.*

LIQUORICE is a perennial plant, and a native of the south of Europe; but the roots, which are raised for medical purposes in considerable quantities in England, are preferred to those imported from abroad, which are very frequently mouldy and spoiled. The roots are very long, about an inch thick, flexible, fibrous, externally of a brown colour, internally yellow, and when fresh, juicy. Their taste is very sweet, combined with a slight degree of bitter when long kept in the mouth. They are prepared for use by peeling them, cutting

away all the fibres and decayed parts. It is necessary to preserve them in a very dry place, as they are extremely apt to spoil.

The powder of liquorice usually sold is often mingled with flour, and perhaps also with substances not so wholesome. The best sort is of a brownish yellow colour, the fine pale yellow being generally sophisticated, and it is of a very rich sweet taste, much more agreeable than that of the fresh root.

Neumann got from 960 parts of dried liquorice, 300 alcoholic extract, and afterwards 210 watery; and inversely, 540 watery, and only 30 alcoholic. The original alcoholic extract is the sweetest.

Robiquet obtained from liquorice root, 1. Amylaceous feculum; 2. A saccharine substance having no resemblance to sugar; 3. A new crystalline substance; 4. A resinous oil, which is the cause of the acrimony in the decoctions; 5. Phosphate and malate of lime and magnesia; 6. Woody fibre.

*Medical use.*—Its predominant constituents being saccharine and mucilaginous matter, its only action is that of a mild demulcent, and as such it is frequently used in catarrh, and in some stomach complaints, which seem to arise from a deficiency of the natural mucus which should defend the stomach against the acrimony of the food, and the fluids secreted into it.

On account of its bulk it is rarely exhibited in substance, but more frequently in infusion or decoction.

### Extract of Liquorice.

As this extract is never prepared by the apothecary, but commonly imported from other countries, the Edinburgh college have inserted it in their list of materia medica. It is imported in cylindrical rolls, covered with bay leaves. It should be perfectly black, brittle when cold, and break with a smooth and glassy fracture, have a sweet taste, without empyreuma, and be entirely soluble in water. It is prepared from the fresh roots by expression, decoction, and inspissation.

The best foreign extract of liquorice is prepared in Catalonia, but it is not so pure as the refined liquorice sold in the shops, in small cylindrical pieces, not thicker than a goose-quill.

Neumann got from 480 parts of Spanish extract, 460 watery extract, and the residuum was not affected by alcohol; and inversely, he got 280 alcoholic, and 180 watery extract. In this last case the alcoholic extract contained all the sweetness, the watery having scarcely any taste. From the similarity of their taste, and its not being crystallizable, Dr Thom-

son has referred its saccharine matter to his new genus sarcocol.

The extract possesses the same properties with the root, and is used for the formation of several kinds of troches.

GRATIOLA OFFICINALIS. *Ed. Dub.*

Willd. *g.* 49, *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Personatæ.*

Hedge-hyssop.

*Off.*—The plant.

HERBA GRATIOLÆ OFFICINALIS. *Ed.*

HERBA GRATIOLÆ. *Dub.*

THIS is a perennial plant, a native of marshy situations in the south of Europe. It is gathered for use when in flower. It has no smell, but a very bitter, somewhat nauseous taste. It is a drastic purgative and emetic, and a very powerful anthelmintic, but its use requires caution. In substance it may be given to the extent of half a drachm, and in infusion to three drachms.

Vauquelin has analysed hedge-hyssop. Its expressed juice contains, in a state of solution, 1. A brown gummy matter; 2. A particular resinous matter extremely bitter; 3. A small quantity of animal matter; 4. Muriate of soda, and perhaps malate of potass. What remains after expression, contains malate and phosphate of lime and iron, probably in the state of phosphate. M. Vauquelin thinks, that the active and purgative ingredient is the substance soluble in alcohol, which he has called a resinoid, as it is the only one possessing taste. Its solubility in water, which is increased by the gum and salts, explains why the infusion, and still more the decoction, are drastic purgatives.

GUAIACUM OFFICINALE. *Ed. Lond. Dub.*

Willd. *g.* 819, *sp.* 2. *Decandria Monogynia.*—Nat. ord. *Gruinales.*

Guaiac.

*Off.*—The wood and resin.

*a)* LIGNUM GUAIACI OFFICINALIS. *Ed.*
LIGNUM GUAIACI. *Lond. Dub.*

*b)* RESINA GUAIACI OFFICINALIS. *Ed.*
RESINA GUAIACI. *Lond.*
GUMMI-RESINA GUAIACI. *Dub.*

THIS tree is a native of the West Indies, and grows to a middling size. The wood is heavier than water, very hard, resinous, and of a greenish-black colour. Its taste is bitter-

ish, and when kindled it gives out a pleasant smell. It is brought either in pieces which are sometimes covered with a pale yellow alburnum, or already rasped, when by division its colour appears greenish-brown, or yellow. The bark is thin, of an ash-grey, or blackish colour, and apparently composed of several laminæ. It is less resinous than the wood. Neumann got from 7680 parts of the wood, 1680 alcoholic, and 280 watery extract; and inversely, 740 watery, and 960 alcoholic. From 3840 of the bark he got 560 alcoholic, and 320 watery; and inversely, 620 watery, and 240 alcoholic. The resin exudes spontaneously in tears, but is principally obtained by sawing the wood into billets about three feet long, which are then bored with an augre longitudinally. One end of these is laid upon a fire, so that a calabash may receive the melted resin, which runs through the hole as the wood burns. It may be also obtained by boiling the chips or sawings of the wood in water and muriate of soda. The resin swims at the top, and may be skimmed off.

Guaiac resin has a brownish-yellow colour externally; when held against the light is transparent, breaks with an uniform smooth shining fracture, of a bluish-green colour, is pulverizable, and the powder has a white colour, gradually becoming bluish-green; is fusible in a moderate heat, but not softened by the heat of the fingers; without proper smell or taste, but when thrown on hot coals diffusing an agreeable odour, and when swallowed in a state of minute division, causing an insufferable burning and prickling in the throat. Its specific gravity is 1.23. Neumann got from 480 parts, 400 alcoholic, and only 10 watery extract; and inversely, 80 watery, and 280 alcoholic. Mr Brande has more lately investigated this substance with much care. Digested with water, about one-tenth of it is dissolved, the water acquiring a sweetish taste and greenish-brown colour. The liquid, when evaporated, leaves a brown substance, soluble in hot water and alcohol, but scarcely in sulphuric ether, and precipitating the muriates of alumina and tin. Alcohol readily forms with guaiac a deep brown-coloured solution, rendered milky by water, and precipitated pale green by the muriatic and sulphuric acids, brown by the nitric, and pale blue by the oxymuriatic, but not by the acetic acid or alkalies. The solution in ether exhibits nearly the same properties. Guaiac is soluble in about 15 parts of solution of potass, and in 38 of ammonia; and the solutions are precipitated by the nitric, muriatic, and diluted sulphuric acids. Sulphuric acid dissolves it, and nitric acid converts it into oxalic acid. On being burnt it leaves a large proportion of charcoal. Dr Wollaston has discovered a cu-

rious property of guaiac. By exposure to air and light, it acquires a green colour. This effect is produced in the greatest degree by the most refrangible rays. In the least refrangible rays it is disoxydized, and the yellow colour is restored. The same effect is produced by hot metal. According to this analysis, it differs from the resins in the changes of colour produced on it by water and light, and the action of the acids, in not forming tannin when treated with nitric acid, and in the large proportion of charcoal it affords when burnt. It is sometimes adulterated with colophony or common resin ; but the fraud is easily detected by the smell of turpentine emitted when thrown on live coals.

*Medical use.*—Taken internally, guaiac commonly excites a sense of warmth in the stomach, a dryness of the mouth, with thirst. It increases the heat of the body, and quickens the circulation. If the patient be kept warm, it produces diaphoresis ; if exposed freely to the air, an increased flow of urine. In large doses it is purgative.

Guaiac is a useful remedy,

1. In rheumatism and gout.
2. In certain venereal symptoms ; as in foul indolent ulcers, and a thickened state of the ligaments or periosteum, remaining after the body is reduced by a mercurial course. Guaiac will also suspend the progress of some of the secondary symptoms.
3. In cutaneous diseases.
4. In ozena, aud scrofulous affections of the membranes and ligaments.

The wood is always exhibited in decoction. From the resinous nature of the active constituent of this substance, this cannot be a very active preparation, as the menstruum is totally incapable of dissolving, though it may suspend a little of the resin. The decoction of an ounce may be drunk in cupfuls in the course of a day.

The resin may be exhibited,

1. In substance, made either into pills, or suspended in water in the form of an emulsion. In this way, from 10 to 30 grains of the resin may be taken in the day.
2. In solution ; in alcohol. About half an ounce of the tincture, with three ounces of water, is a sudorific dose for an adult, if he attend to keep himself warm.
3. Combined with an alkali.

HÆMATOXYLON CAMPECHIANUM. *Ed. Dub. Lond.*

Willd. *g.* 830, *sp.* 10. *Decandria Monogynia.*—Nat. ord. *Lomentaceæ.*

Logwood.

*Off.*—The wood.

LIGNUM HÆMATOXYLI CAMPECHIANI. *Ed.*

LIGNUM HÆMATOXYLI. *Lond. Dub.*

THIS tree was introduced from the Honduras into Jamaica, where it is now very common. The wood is firm, heavy, and of a dark red colour. Its taste is sweet, with a slight degree of astringency. It forms a precipitate with a solution of gelatine, very readily soluble in excess of gelatine, and with sulphate of iron it strikes a brighter blue than any other astringent I have tried. It is used principally as a dye-wood, but also with considerable advantage in medicine.

Its extract is sweet and slightly astringent; and is therefore useful in obstinate diarrhœas, and in chronic dysentery.

HELLEBORUS.

Willd. *g.* 1089. Smith, *g.* 256. *Polyandria Polygynia.*—Nat. ord. *Multisiliquæ.*

*Sp.* 2. Willd. HELLEBORUS NIGER. *Ed. Lond.* Melampodium. *Dub.*

Black hellebore.

*Off.*—The root.

RADIX HELLEBORI NIGRI. *Ed. Lond. Dub.*

THIS plant, which was formerly called *Melampodium*, is perennial, and grows wild in the mountainous parts of Austria, and on the Pyrenees and Appennines. The earliness of its flowers, which sometimes appear in December, has gained it a place in our gardens.

The roots consist of a black furrowed roundish head, about the size of a nutmeg, from which short articulated branches arise, sending out numerous corrugated fibres, about the thickness of a straw, from a span to a foot in length, deep brown on the outside, white or yellowish-white within, and of an acrid, nauseous and bitterish taste, exciting a sense of heat and numbness in the tongue, and of a nauseous acrid smell. These fibres only are used in medicine, and the head and decayed parts are rejected. For the roots of the real black hellebore, the roots of the Adonis vernalis, Trollius Europæus, Actæa spicata, Astrantia major, Helleborus viridus fœtidus, Veratrum album, and Aconitum neomontanum, are often substituted. The last is a most virulent poison, and may be distinguished by its roots being fusiform, or nearly

globular, sending out numerous very brittle fibres, of a greyish-black or brown colour, as thick as a man's finger, and repeatedly divided. But the surest way to avoid mistakes, is by the apothecary cultivating the plant itself in his own garden.

Neumann got from 2880 grains 380 alcoholic, and 181 watery extract; and inversely, 362 watery, and 181 alcoholic. Its active constituent seems to be of a volatile nature; for it loses its virtues by keeping, and water distilled from it has an acrid taste.

*Medical use.*—In large doses, hellebore is a drastic purgative; in smaller doses, it is diuretic and emmenagogue. It is principally used as a purgative in cases of mania, melancholy, coma, dropsy, worms and psora, and as an emmenagogue. But its use requires very great caution, for its effects are very uncertain, and affected by many circumstances.

It is commonly exhibited in the form of extract, although its activity be much dissipated by the preparation. An infusion and tincture certainly promise to be medicines of more uniform powers. Willdenow says, that the black hellebore of the ancients is his fifth species, the Helleborus orientalis.

*Sp.* 6. Willd.; *sp.* 2. *Smith.* Helleborus fœtidus. *Lond. Dub.*

Bears foot. Stinking hellebore. Settiswort.

*Off.*—The leaves.

Folia hellebori fœtidi. *Lond.*

Folia helleborastri. *Dub.*

This species is a native of England. It is perennial, grows in shady places, and under hedges, and flowers in March and April. The leaves have an acrid, bitter, nauseous taste, and unpleasant smell, especially when they are fresh. When dried, they are frequently given as a domestic medicine to destroy worms; but they must be used sparingly, being so violent in their operation, that instances of their fatal effects are recorded.

Hirudo medicinalis. *Dub.*

The Leech.

*Cl. Vermes.* Ord. *Helmintheca.*

Only one species of leech is used in medicine. It has a flat and slimy body, composed of rings, tapering towards the head, which is turbinated, commonly about two or three inches long, and of the thickness of a goose-quill, but capable of elongating or contracting itself very much. Its back is of

a dull olive-green colour, divided into three nearly equal parts by four yellow longitudinal lines, the two lateral entire, the two central broken with black. Besides these, between the lateral and central lines on each side, there are two others, resembling a chain of black and yellow. The belly is turkey blue, irregularly marked with yellow spots. It attaches itself to solid substances by either end, being furnished with a circular sucker at the anal extremity, and a horse-shoe one at the head, with a triangular mouth in the centre.

They should be collected in summer, in waters having a clear sandy bottom, as the bite of those found in stagnant waters and marshes is said to cause pain and inflammation. For the same reason, the horse-leech, which is entirely brown, or only marked with a marginal yellow line, is commonly rejected, although they are used frequently in the North of Europe, and during the late scarcity of leeches have occasionally been employed, without any bad consequences, in this country. The vulgar story of their drawing the whole blood out of the body, by evacuating it at one end as fast as they sucked it in at the other, if true, would give them a superiority over the others, as when a sufficient quantity of blood was drawn, there could be no difficulty in making them quit, even without passing a ligature round their necks.

Leeches are best preserved for use in a bottle half filled with pure spring or river water, and covered with gauze or muslin, although they are said not to die even in an exhausted receiver, or in a vessel filled with oil. It is advisable frequently to change the water in which they are kept, although there are instances of their living many months, and even years, in the same water; and it is remarkable that water, in which they are, keeps much longer sweet than by itself. It is scarcely necessary to observe, that whenever the water becomes turbid, or foul, or gets an unpleasant smell, or any of the leeches dies in it, it should be changed. They should always be kept in a moderate temperature, about 50° Fahr. Some recommend throwing a little bran into the water; but it is so well ascertained that they will live for years without any such addition, that it is better not to attempt to feed them, until we are better acquainted with their natural food. Though apparently so hardy, leeches are sometimes subject to great mortality, from unknown causes, as in 1798 and 1799. Infection in some cases seems evident. To avoid danger from this source, they should be kept in several small vessels, rather than in one large reservoir; and when fresh leeches are procured, they should always be kept by themselves, and their health ascertained, before they are added to the general stock. When they have gorged themselves with blood, they frequently die

of indigestion, and cause a great mortality even among those which have not been used. To avoid this danger, leeches, which have recently sucked, should also be kept by themselves, until they have recovered their usual vigour. The treatment of the individuals which have performed their office has been the subject of some controversy. One recommends using no means to make them disgorge the blood they have sucked, but only to immerse them for half an hour in milk-warm water, and to change their water regularly every second day for some time; others advise stripping them, as it is called, that is, taking hold of the tail between the finger and thumb of the left hand and drawing the animal through those of the right, so as to evacuate the blood; while others, again, apply salt to their heads, until they vomit all the blood they have sucked. Leeches change their skin frequently. At that time they are subject to indisposition, and will not bite. The removal of the old cuticle may sometimes be assisted by wiping them with a bit of soft linen.

*Medical use.*—Leeches are a very old and useful remedy in every case requiring local blood-letting. They cause less irritation than cupping, and can often be applied nearer to the part.

They are used,

1. In the headach of the first or inflammatory stage of continued fever.
2. In inflammation of all kinds, ophthalmia, phrenitis, cynanche, rheumatisms, odontalgia, podagra.
3. In some cases of rubeola and scarlatina.
4. In suppressed natural or habitual hæmorrhagies, especially piles.
5. In plethora of the head, chincough, in mania from suppressed discharges.
6. Dysuria phlogistica.

The application of leeches is sometimes attended with difficulty. When changing their skin, they will not bite, and are averse to it in cloudy rainy weather, and in the evening. When kept out of the water some minutes before they are applied, and allowed to crawl on dry linen, they are said to bite more eagerly. The part to which they are to be applied should be very well washed, first with soap and water, and afterwards with water, or milk and water, and if covered with strong hairs, should be shaved. When they are not inclined to bite, the part may be moistened with milk, or a little blood drawn from it by a scratch with a lancet. When they fix, they inflict, without causing much pain, a wound of three minute flaps, meeting at equal angles, from which they suck

blood until they are gorged, and drop off spontaneously, or are forced to quit their hold by sprinkling on them a little salt. A large leech will draw about an ounce of blood; but the quantity may be much increased by bathing the wounds with tepid water, or applying over them cupping glasses. Sometimes it is even difficult to stop the bleeding; but it will always cease on applying a little lint, and continuing pressure a sufficient length of time.

HORDEUM DISTICHON. *Ed. Dub. Lond.*

Willd. *g.* 151. *sp.* 3. *Triandria Digynia.*—Nat. Ord. *Gramina.*

Barley.

*Off.*—The seed called Pearl-barley.

SEMINA HORDEI DISTICHI. Semina decorticata. *Dub. Ed.*

SEMINA HORDEI. Semina tunicis nudata. *Lond.*

BARLEY is an annual plant, cultivated in almost every country of Europe. Linnæus says that it is a native of Tartary, but without adducing sufficient proof.

Pearl-barley is prepared by grinding off the husk of rough barley, and forming the grain into little round granules, of a pearly whiteness. In this state, barley consists almost solely of amylaceous matter; when boiled it forms an excellent article of nourishment; and a decoction of it, properly acidulated, is one of the best beverages in acute diseases.

Barley meal, according to Fourcroy and Vauquelin, contains a little unctuous coagulable oil, sugar, starch, an animal substance partly soluble in water, and partly in glutinous flocculi; phosphate of lime and magnesia, silica, iron, and a little acetic acid.

HUMULUS LUPULUS. *Lond.*

Willd. *g.* 1795, *sp.* 415. Smith, *g.* 415, *sp.* 1. *Diœcia Pentandria.*—Nat. ord. *Scabridæ.*

Hop.

*Off.*—The strobiles dried.

STROBILI HUMULI. Strobili siccati. *Lond.*

STROBILI HUMULI LUPULI.

THE hop is an indigenous perennial climbing plant, cultivated to a great extent in Kent, and some other counties in England, for its leafy tops, which are used in the brewing of ale and porter; and as a very considerable revenue arises from the duty imposed on them, the use of all other bitters, such as quassia, &c. is prohibited by act of parliament; as,

indeed, hops themselves once were. In the north of Europe, the young shoots are eaten instead of asparagus.

Hops are intensely bitter, aromatic, and astringent. By simple infusion the aroma is extracted; by short boiling the bitter, and by long-continued boiling, the aroma is dissipated, and the astringency predominates. The aroma resides in a volatile oil, and the astringency in a species of tannin, for sulphate of iron is blackened by it. It also contains a resin from which it has its bitterness, and a nauseous mucilaginous extractive, which alcohol precipitates from the infusion. Crystals of nitrate and muriate of potash appear in a long kept extract. The old writers say, that hops are added to malt liquors on account of the lithontriptic virtues which they were supposed to possess; thus Ray affirms, that since the Londoners added hops to their beer, they have been less subject to calculous complaints; and if we were to believe Lobb, a very hard urinary calculus was softened by a decoction of hops. Their evident effects are to impart an aromatic bitter, and to retard the acetous fermentation; for malt liquors keep longer in proportion to the quantity of hops added, and the bitterness decreases as the liquor becomes ripe, and disappears as it verges to acidity. Bergius supposes that the sweetness of the malt would hurt the stomach, were it not corrected by the bitterness of the hop. It also probably communicates a narcotic quality. A pillow stuffed with hops is said to have long been a popular remedy, and recent experiments have confirmed the fact, and led to the employment of various preparations of hops in medicine. The dose of the powder is about three grains, although it may be remarked that it is very difficult to powder. It produced sleep, in the experiments of Dr De Roches, in rheumatic, syphilitic, and pectoral complaints. The tincture seemed to possess the same anodyne virtues, but it was not so uniform in its action. Dr Maton gave it in the form of tincture and extract with the best effect, in articular rheumatisms. He did not observe that it had any influence in relaxing the bowels, but the contrary; and he is disposed to believe that the pulse is reduced in frequency, and increased in firmness, by this medicine, in a very direct manner. An ointment compounded with the hop is said, by Mr Freake, to have eased the violent pain in the last stage of cancer, when all other applications were ineffectual.

HYDRARGYRUM. *Dub. Lond.*
HYDRARGYRUS. *Ed.*
Mercury. Quicksilver.

THE general chemical and physical properties of this metal

have been already enumerated. We shall now treat of it more minutely, as forming an important article in the materia medica.

It is found,

1. In its metallic state:
   - *a.* Uncombined.
   - *b.* Alloyed with silver.
   - *c.* Alloyed with copper.
   - *d.* Combined with sulphur (Cinnabar.)
   - *e.* Combined with hydroguretted sulphur (Æthiops minerale.)
2. Oxidized.
   - *a.* Combined with muriatic acid.
   - *b.* ———————— sulphuric acid.

There are considerable mines of mercury in Hungary and in Spain; and what is employed in England is principally imported from the former country.

Mercury, taken into the stomach in its metallic state, has no action on the body, except what arises from its weight or bulk. It is not poisonous, as was vulgarly supposed, but perfectly inert; but, in its various states of combination, it produces decided sensible effects. It quickens the circulation, and increases all the secretions and excretions. According to circumstances, the habit of the body of the patient, the temperature in which he is kept, the nature of the preparation, and the quantity in which it is exhibited, its effects are indeed various: it sometimes increases one secretion more particularly, sometimes another; but its most characteristic effect is the increased flow of saliva which it generally excites, if given in sufficient quantity. Its particular effects, and means of producing each of them, will be noticed hereafter.

Mercury, or some of its preparations, is exhibited,

1. As an errhine. The sub-sulphate of mercury.
2. As a sialogogue. Mercury, in almost any form.
3. As a cathartic. The sub-muriate of mercury, (calomel.)
4. As a diuretic. The oxides, the muriate, and the submuriate, combined with other diuretics.
5. As a sudorific. Calomel, conjoined with a sudorific regimen.
6. As an emmenagogue.
7. As an astringent. Muriate of mercury.
8. As a stimulant. Muriate of mercury.
9. As an antispasmodic.
10. As an anthelmintic.

With some of these views, mercury is frequently exhibited,

1. In febrile diseases; in obstinate agues.
2. In inflammatory diseases; in indolent and chronic inflammations, especially of the glandular viscera, as the liver, spleen, &c.
3. In exanthematous diseases; variola.
4. In profluvia; in dysentery.
5. In spasmodic diseases; tetanus, trismus, hydrophobia, &c.
6. In cachectic diseases; anasarca, ascites, hydrothorax, hydrocephalus, &c.
7. In impetigines; scrofula, syphilis, lepra, icterus, &c.
8. In local diseases; in caligo corneæ, amaurosis, gonorrhœa, obstipatio, amenorrhœa suppressionis, tumours of various kinds, herpes, tinea, psora, &c.

Mercury occasionally attacks the bowels, and causes violent purging, even of blood. The effect is remedied by intermitting the use of the medicine, and by exhibiting opium.

At other times it is suddenly determined to the mouth, and produces inflammation, ulceration, and an excessive flow of saliva. In this case, too, the use of the mercury must be discontinued for a time; when, according to Mr Pearson's advice, the patient should be freely exposed to a dry cold air, with the occasional use of cathartics, Peruvian bark, and mineral acids, and the assiduous application of astringent gargles. On the other hand, the sudden suppression of ptyalism is not without danger. It is most frequently caused by cold liquids being taken into the stomach, or exposure to cold and moisture, while under the influence of mercury. The danger is to be obviated by the quick introduction of mercury, so as to affect the gums, with the occasional use of the warm bath.

Sometimes also a morbid condition of the system occurs during a mercurial course, and tends to a fatal issue. Mr Pearson has termed it Erethismus. It is characterised by great depression of strength; a sense of anxiety about the præcordia; frequent sighing, trembling, partial or universal; a small quick pulse; sometimes vomiting; a pale contracted countenance, a sense of coldness, while the tongue is seldom furred, or the vital or natural functions much disordered. In this state, a sudden or violent exertion of muscular power will sometimes prove fatal. To prevent dangerous consequences, the mercury must be discontinued, whatever may be the stage, extent, or violence of the disease for which it has been exhibited, and the patient must expose himself freely to a dry and cool air, in such a manner as shall be at-

tended with the least fatigue; and in the course of ten or fourteen days, he will sometimes be so far recovered, that he may safely resume the use of mercury.

In some particular habits it also produces an exanthematous disease, which sometimes proves fatal, well known by the name of erythema or eczema mercuriale and hydrargyria.

From many motives, both laudable and culpable, mercury has been tortured into a greater variety of forms than any other article of the materia medica. Of these Swediaur has given a complete table, in the last edition of his works on the venereal disease. It is too long for insertion in this place: I shall therefore give a systematic view of those mercurial preparations only which enter at least one of the British Pharmacopœias.

Mercury is exhibited,

I. Purified by distillation.
  Hydrargyrum purificatum. *D. L.*
  Hydrargyrus purificatus. *E.*
II. Oxidized.
  A. Protoxide.
    1. By precipitation, from its solution in nitrous acid, by ammonia.
      Oxidum hydrargyri cinereum. *E. L.*
      Pulvis hydrargyri cinereus. *D.*
        Unguentum oxidi hydrargyri cinerei. *E.*
    2. By trituration.
      *a.* With unctuous substances.
        Unguentum hydrargyri. *E. D.*
        ——————— fortius. *L.*
        ——————— mitius. *L. D.*
        Linimentum hydrargyri. *L.*
        Emplastrum ammoniaci cum hydrargyro. *L. D.*
        ——— hydrargyri. *E. L.*
      *b.* With saccharine substances,
        Pilulæ hydrargyri. *L. D. E.*
      *c.* With carbonate of lime,
        Hydrargyrum cum creta. *L. D.*
      *d.* With carbonate of magnesia,
        Hydrargyrum cum magnesia. *D.*
  B. Peroxide.
    1. By the action of heat and air.
      Oxydum hydrargyri. *D.*
      Oxydum hydrargyri rubrum. *L.*
    2. By the action of nitrous acid,
      Oxidum hydrargyri rubrum *per acidum nitricum.* *E.*
      Oxydum hydrargyri nitricum. *D.*
      Nitrico-oxydum hydrargyri. *L.*

Unguentum oxidi hydrargyri rubri. *E.*
———— subnitratis hydrargyri. *D.*
———— hydrargyri nitrico-oxydi. *L.*

III. Oxidized and combined with acids;
A. Protoxide.
1. With nitrous acid:
*a.* Unguentum nitratis hydrargyri. *L.*
———— supernitratis hydrargyri. *D.*
———— nitratis hydrargyri fortius, *vulgo* Unguentum citrinum. *E.*
*b.* Unguentum nitratis hydrargyri mitius. *E.*
2. With sulphuric acid:
Sub-sulphas hydrargyri flavus. *E.*
Oxydum hydrargyri sulphuricum. *D.*
3. With muriatic acid:
*a.* By sublimation.
Sub-murias hydrargyri. *L.*
Sub-murias hydrargyri *mitis* sive *Calomelas. E.*
Sub-murias hydrargyri sublimatum. *D.*
Pilulæ hydrargyri sub-muriatis. *L.*
*b.* By precipitation.
Sub-murias hydrargyri præcipitatus. *E. D.*
4. With acetic acid:
Acetas hydrargyri. *E.*
Acetis hydrargyri. *D.*
B. Peroxide.
1. Muriate.
Murias hydrargyri corrosivus. *E.*
———— corrosivum. *D.*
Oxymurias hydrargyri. *L.*
Liquor oxymuriatis hydrargyri. *L.*
2. Sub-muriate with ammonia,
Submurias hydrargyri ammoniatum. *D.*
Hydrargyrum præcipitatum album. *L.*
Unguentum sub-muriatis hydrargyri ammoniati. *D.*
Unguentum hydrargyri præcipitati albi. *L.*

IV. Combined with sulphur.
1. By trituration,
Sulphuretum hydrargyri nigrum. *E. D.*
2. By sublimation,
Sulphuretum hydrargyri rubrum. *L. D.*

HYOSCYAMUS NIGER. *Ed. Lond. Dub.*

Willd. *g.* 378, *sp.* 1. Smith, *g.* 99. *sp.* *Pentandria Monogynia.*—Nat. ord. *Solanaceæ.*

Common henbane.

*Off.*—The herb and seeds.

*a)* HERBA HYOSCIAMI NIGRI. *Ed.*
FOLIA HYOSCIAMI. *Lond.*

HERBA HYOSCIAMI. *Dub.*
*b)* SEMINA HYOSCIAMI NIGRI. *Ed.*
SEMINA HYOSCIAMI. *Lond.*

HENBANE is an annual plant, which grows in great abundance in most parts of Britain, by the road sides, and among rubbish, and flowers in July. Its smell is strong and peculiar, and, when bruised, something like tobacco, especially when the leaves are burnt; and, on burning, they sparkle, as if they contained a nitrate: when chewed, however, they have no saline taste, but are insipid, mild, and mucilaginous. Henbane, in a moderate dose, often produces sweat, and sometimes an eruption of pustules, and generally sound sleep, succeeded by serenity of mind, and recruited vigour of the body; but like the other narcotics, instead of these, it sometimes gives rise to vertigo, headach, and general uneasiness. With particular individuals, it occasions vomiting, colic pains, a copious flow of urine, and sometimes purging. In excessive doses, its effects are fatal; general debility, delirium, remarkable dilatation of the pupils of the eyes, convulsions, death. Upon the whole, like opium, it is a powerful anodyne; and, like cicuta, it is free from any constipating effect, having rather a tendency to move the belly.

*Med. use.*—From the writings of Dioscorides and others, it appears, that different species of henbane have been long used in the practice of medicine. By Celsus it was applied externally as a collyrium in ophthalmia; for allaying the pain of the toothach; and he gave it internally as an anodyne.

Its use, however, was for a long period entirely relinquished, until revived by Dr Störk of Vienna, in those cases where an anodyne is requisite, and where there are objections to the use of opium. It is employed in wandering rheumatic pains, in indurations of the mammæ from retained milk, painful swellings, whether scirrhous or not, scrofulous and cancerous ulcers, inflamed piles, and spasms of the bowels from increased irritability; under the form of a cataplasm of the bruised leaves, with bread and milk; of an ointment, made of the powder of the leaves, with wax and oil; of a simple powder, sprinkled on the sore, or of a decoction in milk as an injection. An infusion prepared by digesting the bruised leaves in olive oil is also usefully applied in inflammation of the bowels, kidneys, testicles, urethra, painful retention of urine, and in blind piles.

An extract from the leaves, or from the seeds, is the form in which it is given internally; and it has been used with advantage in a variety of nervous affections, as mania, melancholia, epilepsy, hysteria, trismus, and spasms from injured nerves, in rheumatism and arthritis, in glandular swellings,

in obstinate ulcerations, and in every case where it is desirable either to allay inordinate action, or to mitigate pain. Its dose may be gradually increased from half a grain. Collin pushed it to the length of 30 grains for a dose.

The extract of henbane has been lately much used by oculists for dilating the pupils of the eyes, in order to facilitate the extraction or breaking down of the cataract, to diminish sensibility, to destroy adhesions, to reduce protrusions of the iris, and to dilate contraction of the pupil. The mode of application is by dropping a few drops of solution of the extract into the eye, or applying them with a camel's hair brush. The greatest effect is produced in about four hours, and it is generally over in twelve. Vision is not impaired during its action.

HYSSOPUS OFFICINALIS. *Ed. Dub.*

Willd. *g.* 1096, *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*

Hyssop.

*Off.*—The herb and leaves.

HERBA HYSSOPI OFFICINALIS. *Ed.*

FOLIA HYSSOPI. *Dub.*

HYSSOP is a perennial herb which grows wild in Germany. Its leaves have an aromatic smell, and a warm pungent taste. Its virtues depend entirely on an essential oil which rises in distillation both with water and with alcohol. Besides the general virtues of aromatics, its preparations were formerly recommended in humoral asthmas, coughs, and other disorders of the breast and lungs, and were said to promote expectoration.

ICHTHYOCOLLA. *Dub.*

Isinglass.

Isinglass is prepared from many species of Acipenser. The Dublin college specify the *A. sturio* or Beluga, and the *A. Ruthenus* or Sterlet, besides which a great deal is obtained from the *A. sturio*, the Sturgeon, and *A. stellatus*, the Serruga.

The preparation of isinglass is almost peculiar to Russia. It is made in all places where the large species of sturgeon are caught, as on the Dneiper, the Don, and especially on the Caspian sea, also on the Volga, the Ural, the Oby, and the Irtysh. That prepared from the sturgeon is reckoned the best, and next to it, that from the beluga. It also various according to the mode of preparation. On the Volga and Ural, the sounds are watered while fresh, and dried to a certain degree. The outer skin is next taken off, and the inner glossy white membrane is

twisted, and then completely dried. The best is usually rolled into the form of a snake or heart; the second folded in leaves like a book; and the worst is dried without any care. In other places, as at Gurief, fish-glue is extracted from the sounds by boiling. This is cut into slabs or plates, is perfectly transparent, and has the colour of amber. On the Okka, where the sterlet only is to be had, the sounds are beat just as they are extracted from the fish, and dried into glue.

Good isinglass is white, in some degree transparent, dry, composed of membranes, not too thick, and without any smell.

The properties of isinglass depend entirely on the gelatin, of which it principally consists. One hundred grains of good isinglass were found by Mr Hatchett to contain rather more than ninety-eight of matter soluble in water. A nutritious jelly may be prepared from it. A watery solution of it is used as a test of the presence of tannin, and for the clarification of spiritous liquors. Sir H. Davy's solution for the former purpose consists of 120 grains of isinglass dissolved in twenty ounces of water; and if properly made, it has a tendency to gelatinize, at temperatures below 50° F.

It is employed in the preparation of English court-plaster.

Inula helenium. *Dub.*

Willd. *g.* 1489, *sp.* 1. Smith, *g.* 369, *sp.* 1. *Syngenesia superflua.*—Nat. ord. *Compositæ radiatæ.*

Elecampane.

*Off.*—The root.

Radix enulæ campanæ. *Dub.*

This is a very large downy perennial plant, sometimes found wild in moist rich soils. It flowers in July and August. The root, especially when dry, has an agreeable aromatic smell: its taste, on first chewing, is glutinous, and, as it were, somewhat rancid; in a little time it discovers an aromatic bitterness, which by degrees becomes considerably acrid and pungent.

Neumann got from 480 grains of the dry root, 390 watery, and 5 alcoholic extract; and inversely, 150 alcoholic, and 300 watery. In distillation, alcohol elevated nothing; but the distilled water was first observed by Geoffroy to be milky, and mixed with flocculi of a cineritious concrete volatile oil, partly swimming, and partly sinking in the water. He also ascertained that it was fusible, and compares it to camphor or benzoic acid. Neumann likewise examined it, and considered it as a peculiar substance, having some resemblance to camphor. He found that it melts with a gentle heat, and when cold appears softer and more unctuous; that it never

assumes a crystalline form, but when dry proves opaque and crumbly; that laid on burning coals it totally exhales; that it is soluble in alcohol, but insoluble in water; and that by keeping it gradually loses the smell of elecampane. This root has also been discovered by Rose to contain a matter having some analogy with starch, the properties of which have been described under the title of Inulin.

According to Funke's analysis, elecampane root contains, 1. A crystallizable volatile oil; 2. A peculiar feculum; 3. An extractive matter; 4. Free acetic acid; 5. A crystallizable resin; 6. Albumen; 7. Fibrous matter. The ashes contain carbonates of lime and of magnesia, silica, and a trace of iron.

*Medical use.*—It is a gently stimulating medicine, nearly similar in its action to angelica. The extract is merely a slight bitter, as the essential oil is totally dissipated in the preparation.

IPECACUANHA.

RADIX IPECACUANHÆ. *Ed.*

RADIX IPECACUANHÆ. Callicocca Ipecacuanha. Brotero, Transactions of the Linnæan Society, vol. vii. *Lond. Dub.*

IPECACUAN, in the language of South America, means vomiting root, and is applied to various vegetables which possess that property in any remarkable degree; hence the confusion and contradictions which have long prevailed concerning the plant which furnishes our officinal Ipecacuan: and this confusion is increased by several varieties of Ipecacuan being found in the shops.

1st, The ash-coloured or Peruvian ipecacuan is a small wrinkled root, bent and contorted into a great variety of figures, brought over in short pieces, full of wrinkles and deep circular fissures, quite down to a small white woody fibre that runs in the middle of each piece: the cortical part is compact, brittle, looks smooth and resinous upon breaking: it has very little smell; the taste is bitterish and subacrid, covering the tongue as it were with a kind of mucilage. This, according to Mutis, is obtained from the Psycotria emetica, and is that commonly used.

2d, The brown ipecacuan is small, and somewhat more wrinkled than the foregoing; its bark is of a brown or blackish colour without, and white within; this is brought from Brazil, and is the root of a Cephaëlis, which is perennial, and grows in moist shadowy situations. A complete monography of it, and an excellent plate, were published, in the sixth volume of the Transactions of the Linnæan Society, by Professor Brotero, who calls it the Callicocca Ipecacuanha; but the

genus Callicocca has been united by Willdenow with that of Cephaëlis, to which we have therefore referred it. The plate of Brotero corresponds with that published in Woodville's Medical Botany, vol. iii., from a plant sent in spirits from Brazil by Governor Philips to Sir Joseph Banks, but which unfortunately was not in flower, and also with the rude draught of Piso, who first examined it. It has been sometimes observed, even in a small dose, to produce violent effects.

3d, The white sort is woody, has no wrinkles, and no perceptible bitterness in taste. It is probably the root of a viola. Though taken in a large dose, it has scarcely any effect at all.

Besides these, the name of Ipecacuan is given to various species of Cynanchum, Asclepias, Euphorbia, Dorstenia, and Ruellia. With regard to their comparative strengths, Decandolle says, that vomiting is produced by 22 grains of the Cynanchum Ipecacuanha, 24 of the Psycotria emetica, 60 to 72 of the Viola calceolaria, and one to three drachms of the Viola Ipecacuanha.

Ipecacuan was first brought into Europe about the middle of last century, and an account of it published about the same time by Piso; but it did not come into general use till about the year 1686, when Helvetius, under the patronage of Lewis XIV. introduced it into practice.

Neumann got from 7680 parts, 1440 alcoholic, and afterwards 1880 watery extract; and inversely, 2400 watery, and 600 alcoholic. It has also been analysed by Mr Henry, who supposes it to contain a free acid decomposable by heat, salts of lime, and a matter resembling caoutchouc; and by M. Massonfour, who found in it gallic acid, gum or mucilage, extractive and resin. On the contrary, I find that the tincture of ipecacuan does not redden infusion of litmus, or precipitate solution of gelatine; that it is precipitated by water, by red sulphate of iron, readily acquiring a green colour from excess of the chalybeate, and by infusion of nut-galls. According to Dr Irving, the watery solution is more emetic than the alcoholic, the decoction than the distilled water, and the cortical than the ligneous part. Others have found, that the resinous part is more apt to act upon the intestinal canal, and to operate by stool. By long-continued boiling, it becomes almost inert; and the emetic property of ipecacuan is most effectually counteracted by means of the acetic acid, insomuch that thirty grains of the powder, taken in two ounces of vinegar, produced only some loose stools.

From these experiments it evidently appears, that ipecacuan contains cinchonin and a resin, and that its emetic property does not depend upon the latter, although we can

scarcely attribute it to the former, as in other substances it does not manifest any emetic property. It is, therefore, probably owing to some other principle, soluble in water and alcohol.

*Med. use.*—The primary effect of ipecacuan is that of stimulating the stomach. If the dose be sufficiently large, it excites vomiting, by inverting the peristaltic motion of the stomach and duodenum; in a smaller dose it only produces nausea, and operates by stool; and in a still smaller dose it gently stimulates the stomach, increases the appetite, and facilitates digestion. Its secondary effects depend on the sympathy of other parts with the stomach; and in this way only can we explain its action as an antispasmodic, diaphoretic, expectorant, and in checking hæmorrhagies. Its beneficial effects, in some cases, also seem to be owing to the general concussion given to the whole system during the action of vomiting.

Ipecacuan, properly administered, often proves serviceable,

1. In intermittent fevers. It has frequently succeeded in stopping these, when given about an hour before an accession was expected, and also when given so as to produce vomiting at the time of an accession, or at the end of the cold stage.

2. In continued fevers. We have never seen more decidedly beneficial effects from the use of any medicine whatever, than from the exhibition of ipecacuan in the precursory stage of typhus fever. An emetic, succeeded by diluent diaphoretics, when administered sufficiently early in the disease, very frequently cuts it short at once; and when it fails in this desirable object, it always has a beneficial influence on the progress of the fever.

3. In inflammatory diseases, rheumatism, bubo, swelled testicle.

4. In exanthematous diseases, when the eruption is disposed to recede.

5. In hæmorrhagies, when given in nauseating doses.

6. In profluvia, especially in dysentery, so much so, that it was formerly esteemed a specific against that disease. But Cullen attributes its good effects, in this instance, to its producing a steady determination of the peristaltic motion of the intestine downwards, when given in repeated small doses.

7. In many spasmodic diseases; in epilepsy, asthma, dyspnœa, pertussis, chronic diarrhœa, hysteria, melancholy, mania.

8. In cachectic diseases, as in some kinds of dropsy.

9. In impetiginous diseases; in jaundice.

10. In local diseases; in amaurosis, and several of the dysorexiæ.

11. Lastly, in every instance when we wish to evacuate the stomach, as when it is overloaded with food, or when poison, especially opium, has been swallowed.

The use of ipecacuan, as an emetic, is contra-indicated,

1. Where there is a disposition to hæmorrhagy.
2. Where there is an increased flow of blood towards the head.
3. In very irritable subjects.
4. In pregnant women, and persons afflicted with hernia.

Ipecacuan is exhibited,

1. In substance, in powder. Full vomiting will generally be produced in an adult by a scruple or half a drachm; and though less might answer the purpose, fortunately an overdose is scarcely attended with any inconvenience, as the whole of it is vomited with the contents of the stomach as soon as it operates. The vomiting is promoted and facilitated by drinking copiously of warm watery fluids. On the contrary, when vomiting is not intended, liquids must be rather drunk sparingly, and the dose must be diminished to a grain or less. In such small doses it is conveniently combined with any proper adjunct, in the form of powder, pill, or bolus.
2. In infusion. One drachm may be infused in four ounces of water, and taken in repeated doses till it operate.
3. Infused in wine.

Ipecacuan not only checks the narcotic effects of opium, and is therefore one of the best antidotes for its poison, but reciprocally the emetic powers of ipecacuan are checked by the addition of opium, and the combination operates by increasing the cuticular discharge.

Iris florentina. *Ed.*

Willd. *g.* 97, *sp.* 7. *Triandria Monogynia.*—Nat. ord. *Ensatæ.*

*Off.*—The root. Florentine Orris.

Radix iridis florentinæ.

This is a perennial plant, a native of the south of Europe. The dried roots are imported from Italy. They are white, flattish, knotty, and have a very slightly bitter taste, and an agreeable smell, resembling that of violets.

Neumann got from 480 parts, 77 alcoholic, and afterwards 100 watery, and inversely 180 watery, and 8 alcoholic extract. The distilled water smells a little of the root, but ex-

hibits no appearance of oil. They are chiefly used as a perfume.

JUNIPERUS.

Willd. *g.* 1841. Smith, *g.* 421. *Dioecia Monadelphia.*—Nat. ord. *Coniferæ.*

*Sp.* 10. Willd. *sp.* 1. Smith, JUNIPERUS COMMUNIS. *Ed. Lond. Dub.*

Common juniper.

*Off.*—The berries and tops.

*a)* BACCÆ JUNIPERI. *Lond. Dub.*

BACCÆ JUNIPERI COMMUNIS. *Ed.*

*b)* CACUMINA JUNIPERI. *Lond.*

THIS is an evergreen shrub, growing on heaths and hilly grounds in all parts of Europe. It flowers in May. The berries are chiefly brought from Holland and from Italy. The Italian berries are in general reckoned the best. Juniper berries have a strong, not disagreeable smell, and a warm pungent sweet taste, which, if they are long chewed, or much bruised, is followed by a bitterish one. Their predominant constituents are essential oil, and a sweet mucilaginous matter.

*Medical use.*—To the oil they are indebted for their stimulating, carminative, diaphoretic, and diuretic properties. They are most commonly used in the form of infusion, as a diuretic drink in dropsy. The essential oil may be separated by distillation. It possesses the same properties in a higher degree, and imparts them to ardent spirits. The peculiar flavour and well-known diuretic effects of Hollands, are owing to the oil of juniper. The decoction and extract are very inert preparations of the class of bitters.

Every part of the plant contains the same essential oil; therefore an infusion of the tops is likewise diuretic. The wood also was formerly officinal. In warm countries a resin exudes from the juniper-tree. It is called sandarac, and is often mixed with mastich. It is not a pure resin; for, according to Mr Giese, about one-fifth of it is not soluble in water, or in alcohol, but in ether, resembling in these respects copal.

*Sp.* 6. JUNIPERUS SABINA. *Ed. Lond. Dub.*

Savine.

*Off.*—The leaf.

FOLIA JUNIPERI SABINÆ. *Ed.*

FOLIA SABINÆ. *Lond. Dub.*

THIS is an evergreen shrub, a native of Siberia and Tarta-

ry, but not unfrequent in our gardens. The leaves have a bitter, acrid, biting taste, and a strong disagreeable smell: distilled with water, they yield an essential oil in considerable quantity.

*Medical use.*—Savine is a warm stimulating medicine, capable of producing diaphoresis, and increasing all the secretions, but apt to excite hæmorrhagy, especially from the uterus. It is also recommended as an anthelmintic, and is said to be very efficient in the cure of gout.

Internally, a conserve of the fresh leaves is exhibited in doses of from half a drachm to a drachm.

Externally, the leaves are applied in the form of powder or infusion to warts, carious bones, and old ulcers, and in cases of gangrene, psora, and tinea; an excellent issue ointment is also prepared with the powder. The essential oil is a very active remedy.

*Sp.* 14. JUNIPERUS LYCIA. *Ed. Lond. Dub.*
Olibanum.

*Off.*—A gum resin.
GUMMI-RESINA JUNIPERI LYCIÆ. *Ed.*
OLIBANUM; gummi-resina. *Lond. Dub.*

OLIBANUM is principally collected in Arabia, and brought from Mecca to Cairo, from whence it is imported into Europe. It consists of transparent brittle grains of different sizes, not larger than a chesnut, of a red or yellow colour, having little taste and a peculiar aromatic smell. Neumann got from 480 grains, 346 alcoholic, and 125 watery extract, and inversely, 200 watery, and 273 alcoholic. The distilled spirit and oil both smelt of olibanum, but no oil separated. Braconnot says it is composed of a gum and a resin, acquiring peculiar properties by the action of nitrous acid. Olibanum forms a transparent solution with alcohol, and a milky fluid when triturated with water: it is not fusible, but inflammable, and burns with an agreeable smell. It is the frankincense of the ancients; and the diffusion of its vapour around the altar still forms part of the ceremonies of the Greek and Roman catholic churches.

KINO. Succus spissatus Eucalypti resiniferæ. *Ed.*
KINO; Butea frondosa. *Dub.*
KINO. Arboris, nondum descriptæ, Africanæ, gummi resina. *Lond.*

Kino, the inspissated juice of the brown gum-tree of Botany Bay. The resin of the Butea frondosa. The gum-resin of a non-descript African tree.

KINO was first noticed by Dr Fothergill, who received it

from a druggist as a very fine kind of dragon's blood, and described it as the produce of an African tree called the Pau de Sangue. In Moor's travels up the Gambia, there is a very imperfect account of the tree from which it exudes, and a copy of directions from the African company to their factors, to collect and purchase this gum: but it seems to have been brought to them only in very small quantities, and mixed with gum Senegal. This kind is no longer to be met with in commerce, and is not even mentioned by Mr Jackson among the exports from Mogodore, or by Mr Winterbottom, in his account of Sierra Leone.

I have found in commerce three kinds of kino, easily distinguished by their external appearance.

The first is in very small jet-black fragments, perfectly opaque, without smell, crackling under the teeth when chewed, not colouring the saliva, after some time imparting only a slight astringent taste, not fusible, and difficultly reduced to powder. Powder dark chocolate-brown. Although this has been the longest known in commerce in this place, I have not been able to trace the place of its origin.

The second is in large fragments, on some of which the impression of the vessel into which it had been received while fluid, and in which it had hardened, was evident; colour very dark brown, fracture resinous, appearance homogeneous, with small air bells; in very thin splinters, transparent, and of a ruby red colour: crackling under the teeth when chewed, taste at first somewhat acid, but afterwards becoming considerably bitter and astringent, succeeded by a peculiar sweetness; infusible, and friable; powder of a reddish-brown. This is said to be the extract of the Coccoloba uvifera or sea-side grape; and indeed by comparing it with the specimens of that extract, I have no doubt of the accuracy of my information. The kino imported by the East India Company resembles this in many particulars, but is in smaller fragments.

The third is in dark brown masses of various sizes, either smooth or rounded on the surface, or in fragments often covered with a reddish-brown powder, fracture resinous and very unequal, appearance sometimes homogeneous, but more commonly heterogeneous, mixed with bits of twigs, leaves, &c.; splinters transparent, ruby red; no smell, scarcely crackling under the teeth, but sometimes gritty, from the accidental mixture of sand; taste simply astringent, succeeded by sweetness, and, when long chewed, a portion adheres to the teeth; infusible and friable; powder reddish-brown. This is certainly obtained from the Eucalyptus resinifera, or brown gum tree of New South Wales, by allowing the juice, which

either flows from it spontaneously, or is procured by wounding the tree, to harden in the sun. Some specimens of it in its fluid state have even reached this country.

The Dublin college have indicated the Butea frondosa as the source of kino, but certainly erroneously. It however produces in large quantities a red juice, very analogous to kino, and which may unquestionably be used as a substitute for it. The production of these substances, from so many different trees in Africa, America, Asia, and New Holland, shew that kino is to be considered as a genus of which these are species.

The analysis of kino, published in the first edition of this Dispensatory, has since been confirmed by Vauquelin, as well as the conclusion drawn from it, that it consists principally of tannin, and cannot with propriety be classed among the resins or gum-resins. But the undoubted origin of the third kind, and the examination of a red astringent matter which I picked from a cavity in a specimen of the Cassuarina, or beef-wood, prove that I was hasty in supposing that kino was always obtained from astringent barks by decoction and evaporation.

Kino is much more soluble in boiling than in cold water. The decoction, therefore, on cooling, becomes turbid with a very copious red sediment. The residuum seems to be softened by the heat of boiling water, at least it agglutinates into masses resembling melted red sealing wax dropt into water. By repeated decoctions with very large quantities of water, I have never been able to exhaust it of its soluble parts: the last decoctions had still a deep red colour, and blackened solutions of iron. This residuum is not more soluble in alcohol than in water, and is not fusible, but when thrown on live coals burns away without flame. Vauquelin observed, that when the whole quantity of water necessary to dissolve the soluble parts of kino is not employed at once, the residuum becomes more insoluble. Alcohol dissolves the whole of the Botany-bay kino except its impurities. With a certain proportion of water, this tincture lets fall a copious red precipitate, which may be separated by filtration, but with a larger proportion of water its transparency is only slightly disturbed. It is also remarkable, that alcohol dissolves kino entirely, but does not dissolve the residuum of the decoction. This fact would shew, that the portion extracted by the water had the property of rendering the residuum soluble in alcohol. The solutions of kino precipitate gelatine, and, according to Vauquelin, silver, lead, and antimony, white; and iron, green. I find that it resembles other astringents, in

forming a black precipitate with red sulphate of iron, which however is converted into green by the slightest excess of the sulphate, and by a larger excess is dissolved into a bright green liquid.

*Med. use.*—Kino is a powerful remedy in obstinate chronic diarrhœas and dysenteries; in all passive hæmorrhagies, especially from the uterus; in fluor albus; and in diseases arising from laxity of the solids.

It is exhibited internally, in doses of from ten to thirty grains, in substance, or dissolved in diluted alcohol.

Externally, it is applied as a styptic, to check hæmorrhagies from wounds or ulcers, and to diminish the discharge of sanious or ichorous matter from ill-conditioned ulcers.

LACTUCA. *Ed.*

Willd. *g.* 1404, Smith, *g.* 342. *Syngenesia æqualis.*—Nat. ord. *Compositæ semiflosculosæ.*

*Sp.* 12. LACTUCA VIROSA. *Ed.*

Strong-scented lettuce.

*Off.*—The herb.

HERBA LACTUCÆ VIROSÆ. *Ed.*

THIS plant flowers in August and September, is biennial, and grows wild on rubbish and rough banks, in many places in this country.

The whole plant abounds with a milky juice, intensely bitter, considerably acrid, and having a strong virose smell like opium.

*Medical use.*—An extract prepared from the expressed juice of the leaves of the strong-scented lettuce, gathered when in flower, has been given in dropsies of long standing, proceeding from visceral obstructions, to the extent of half an ounce a-day. It is said to agree with the stomach, to quench thirst, to be gently laxative, powerfully diuretic, and somewhat diaphoretic. Plentiful dilution is allowed during its operation. Dr Collin of Vienna asserts, that out of twenty-four dropsical patients, all but one were cured by this medicine.

*Sp.* LACTUCA SATIVA. *Ed.*

Garden lettuce.

*Off.*—The herb.

HERBA LACTUCÆ SATIVÆ. *Ed.*

THIS succulent vegetable, which is a valuable sallad, and abounds with a cooling bland and pellucid juice before its flower stem shoots, after that abounds with a milky juice of an intensely bitter taste, which becomes brown on drying by

exposure to the air. This juice has been analyzed by Mr John of Berlin, and found to consist of water, caoutchouc as its principal constituent, a trace of resin, a small quantity of bitter extractive, and phosphats, muriats, and sulphats. According to this analysis, the milky juice of lettuce would seem a very inert substance, as the caoutchouc, which is its principal solid constituent, has no action on the body. But the remarkable similarity of the taste of shot-lettuce to that of opium, induced Dr Coxe of Philadelphia to make a series of comparative experiments with lettuce opium on frogs, as well as on the human subject. "These experiments were made on frogs as well as on the human subject. The laudanum made from the opium of the lettuce increases the pulse in force and frequency, and produces generally the same effects as result from similar doses of common laudanum. It has been used with advantage in allaying the pain of chronic rheumatism and cholic; in checking the frequent stools accompanying diarrhœa; in allaying cough, &c. &c." Dr Duncan senior has also taken much pains to discover the best method of preparing lettuce opium, and his trials have been so successful, that it has obtained a place in the last edition of the Edinburgh Pharmacopœia, under the title of LACTUCARIUM.

LAURUS.

Willd. *g.* 798. *Enneandria Monogynia.*—Nat. ord. *Oleraceæ.*

*Sp.* 1. LAURUS CINNAMOMUM. *Ed. Lond. Dub.*
The cinnamon tree.

*Off.*—The inner bark and its essential oil.
*a)* CORTEX LAURI CINNAMOMI. *Ed.*
CORTEX CINNAMOMI. *Dub.* (Liber) *Lond.*
*b)* OLEUM CINNAMOMI. Ejus oleum essentiale. *Lond.*
OLEUM ESSENTIALE CINNAMOMI. *Dub.*

THIS valuable tree is a native of Ceylon, where it was guarded with unremitting jealousy by the Dutch, that they might monopolize the commerce of its productions. They failed, however, in the attempt; and the cinnamon tree is now cultivated, not only in other parts of the East Indies, but also in Jamaica, and other islands in the West Indies. Ceylon now belongs to the British, and Captain Perceval has published a very interesting account of the cinnamon tree. It is found in greatest perfection in the immediate neighbourhood of Columbo, and grows from four to ten feet high, very bushy. The leaves resemble those of the laurel, and, when chewed, have the hot taste and smell of cloves. The blossom is white and very abundant, but diffuses no odour. The fruit

resembles an acorn, and a species of fixed oil is obtained from it. There are several different species of cinnamon trees, or trees resembling them in Ceylon, but four only are barked by government; the honey cinnamon, the snake cinnamon, the camphor cinnamon, which is inferior to these, and yields camphor from its roots, and camphor mixed with gum from incisions made into it, and the *cabatte* cinnamon, which is harsher and more astringent than the others. The bark is collected at two seasons; the grand harvest lasts from April to August, the little harvest is in December. Such branches as are three years old are lopped off, the epidermis is then scraped off, the bark slit up, loosened, and removed entire, so as to form a tube open at one side. The smaller of these are inserted within the larger, and they are spread out to dry. They are then packed up in bundles. The tasting of those bundles to ascertain their quality is a very disagreeable duty imposed on the surgeons. It excoriates the tongue and mouth, and causes such intolerable pain as renders it impossible for them to continue the occupation two or three days successively. In their turns, however, they are obliged to resume it, and they attempt to mitigate the pain by occasionally eating a piece of bread and butter. It is then made up in large bundles about four feet long, and eighty pounds in weight. In stowing the bales on shipboard, the interstices are filled up with black pepper, a practice which is supposed to improve both spices.

The best cinnamon is rather pliable, and ought not much to exceed stout writing paper in thickness. It is of a light yellowish colour; it possesses a sweet taste, not so hot as to occasion pain, and not succeeded by any after-taste. The inferior kind is distinguished by being thicker, of a darker and brownish colour, hot and pungent when chewed, and succeeded by a disagreeable bitter after-taste. The Dutch were accused of deteriorating their cinnamon by mixing it with a proportion of real cinnamon, but which had been deprived of its essential oil by distillation. This fraud could only be detected by the weaker smell and taste. It is also often mixed with cassia bark. This last is easily distinguishable by its fracture being smooth, and by its slimy mucilaginous taste, without any of the roughness of the true cinnamon.

By distillation with water, it furnishes a small quantity of very pungent and fragrant oil; the water itself remains long milky, and has a strong flavour of cinnamon. The watery extract in Neumann's experiment amounted to 720 from 7680 parts. With alcohol the oil does not arise in distillation, but remains in the extract, which amounts to 960.

The essential oil of cinnamon has a whitish-yellow colour, a pungent burning taste, and the peculiar fine flavour of cinnamon in a very great degree. It should sink in water, and be entirely soluble in alcohol. It is principally prepared in Ceylon.

*Medical use.*—Cinnamon is a very elegant and useful aromatic, more grateful both to the palate and stomach than most other substances of this class. Like other aromatics, the effects of cinnamon are stimulating, heating, stomachic, carminative, and tonic; but it is rather used as an adjunct to other remedies, than as a remedy itself.

The oil is one of the most powerful stimulants we possess, and is sometimes used as a cordial in cramps of the stomach, and in syncope; as a stimulant in paralysis of the tongue, or to deaden the nerve in toothach. But it is principally employed as an aromatic, to cover the disagreeable taste of other drugs.

*Sp.* 2. LAURUS CASSIA. *Ed. Dub.*
The cassia tree.
*Off.*—The bark and flower-buds gathered before they open.
*a)* CORTEX LAURI CASSIÆ. *Ed.*
CORTEX CASSIÆ LIGNEÆ. *Dub.*
*b)* FLORES LAURI CASSIÆ. Flores nondum expliciti. *Ed.*
FLORES NONDUM EXPLICITI CASSIÆ LIGNEÆ. *Dub.*

THIS tree is very similar to the former. The bark, which is imported from different parts of the East Indies and from China, has a great resemblance to the true cinnamon, from which it is only distinguishable by being of a thicker and coarser appearance, and by its breaking short and smooth, while the cinnamon breaks fibrous and shivery.

It resembles cinnamon still more exactly in its aromatic flavour and pungency than in its external appearance, and seems only to differ from it in being considerably weaker, and in abounding more with a mucilaginous matter.

Cassia buds are the flower-buds, which are gathered and dried before they expand. They have the appearance of a nail, consisting of a round head, about the size of a peppercorn, surrounded with the imperfect hexangular corolla, which gradually terminates in a point. They have a brown colour, and the smell and taste of cinnamon.

*Medical use.*—Both the bark and buds of cassia possess the same properties with cinnamon, though in an inferior degree.

The bark is very frequently, and sometimes unintentionally, substituted for the more expensive cinnamon; and the

products obtained from cassia bark and buds, by distillation, are in no respect inferior to those prepared from cinnamon.

*Sp.* 3. LAURUS CAMPHORA. *Ed. Lond. Dub.*
Camphor tree.
See CAMPHORA.

*Sp.* 10. LAURUS NOBILIS. *Ed. Lond.*
Bay tree.

*Off.*—The leaves, berries, and expressed oil of the berries.
a) FOLIUM LAURI NOBILIS. *Ed. Lond.*
FOLIA LAURI. *Lond.*
b) BACCÆ LAURI NOBILIS. *Ed.*
BACCÆ LAURI. *Lond.*
c) OLEUM FIXUM LAURI NOBILIS. *Ed.*

THIS tree is a native of the south of Europe, but bears the winters of this climate perfectly well. Both leaves and berries contain a considerable quantity of essential oil, which renders them aromatic stimulating substances.

The berries are generally brought from the Mediterranean, and are more pungent than the leaves. In Spain and Italy, a considerable quantity of oil is obtained by expression from the fresh berries. It has a green colour, and strong aromatic taste and smell. As it therefore is not a fixed oil, but a mixture of fixed and volatile oil, and as its peculiar properties depend entirely on the presence of the latter, it is incorrectly stated to be a fixed oil by the Edinburgh college. It should rather have been denominated, from the mode of its preparation, an expressed oil.

*Medical use.*—It is only used externally as a stimulant.

*Sp.* 34. LAURUS SASSAFRAS. *Ed. Lond. Dub.*
Sassafras.

*Off.*—The wood, root, and bark.
a) LIGNUM LAURI SASSAFRAS. *Ed.*
LIGNUM SASSAFRAS. *Lond. Dub.*
b) RADIX LAURI SASSAFRAS. *Ed.*
RADIX SASSAFRAS. *Lond. Dub.*
CORTEX SASSAFRAS. *Dub.*

THIS tree is a native of North America, and is cultivated in Jamaica. It is the root which is commonly employed. It is brought to us in long branched pieces. It is soft, light, and of a spongy texture; of a rusty white colour; of a strong pleasant smell, resembling that of fennel; and a sweetish, aromatic, sub-acrid taste. The bark is rough, of a brownish colour on the outside, and ferruginous colour within;

spongy and divisible into layers, and of a stronger taste and smell than the wood.

Neumann got from 480 grains, 80 of alcoholic, and afterwards 60 of watery extract, and inversely 120 watery, and 7.5 alcoholic. In distillation, alcohol elevates nothing, but water a ponderous essential oil, in the proportion of about 10 from 480.

*Medical use.*—Sassafras, from the quantity of volatile oil it contains, is a gently stimulating, heating, sudorific, and diuretic remedy.

It is best given in infusion. The decoction and extract are mere bitters, as the oil is dissipated by the preparation.

The essential oil may be obtained separate by distillation. It is of a whitish-yellow colour, and sinks in water. It is highly stimulating and heating, and must be given only in very small doses.

LAVANDULA SPICA. *Ed. Lond. Dub.*

Willd. *g.* 1099, *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*

Lavender.

*Off.*—The flowering spikes.

FLORES LAVANDULÆ SPICÆ. *Ed.*

FLORES LAVANDULÆ. *Lond. Dub.*

LAVENDER is a well-known, small, shrubby, perennial plant, a native of the south of Europe, but frequently cultivated in our gardens, for the sake of its perfume. There are two varieties. The flowers of both have a fragrant, agreeable smell, and a warm, pungent, bitterish taste; the broad-leaved variety is the strongest in both respects, and yields in distillation thrice as much essential oil as the other; its oil is also hotter, and specifically heavier: hence, in the southern parts of France, where both kinds grow wild, this only is used for the distillation of what is called oil of spike. The narrow-leaved is the variety commonly met with in our gardens.

*Medical use.*—Lavender is a warm stimulating aromatic. It is principally used as a perfume.

LEONTODON TARAXACUM. *Ed. Lond. Dub.*

Willd. *g.* 1407, *sp.* 1. Smith, *g.* 344, *sp.* 1. *Syngenesia æqualis.*—Nat. ord. *Compositæ semiflosculosæ.*

Common dandelion.

*Off.*—The root and leaves.

*a*) HERBA LEONTODI TARAXACI. *Ed.*

FOLIA TARAXACI. *Dub.*

*b*) Radix leontodi taraxaci. *Ed.*
Radix taraxaci. *Lond. Dub.*

This perennial plant is very common in grass fields, and uncultivated places. It flowers from April to July. The whole plant contains a bitter milky juice, which, however, is most abundant in the roots before the flower-stem shoots. The bitterness is destroyed by drying, and therefore the recent roots only should be used.

*Medical use.*—Its vulgar name in all languages shews a popular belief of its possessing diuretic properties; and it was lately a very fashionable remedy in Germany, given in the form of an expressed juice or decoction, or extract prepared from either of them; but it seems to be merely a mucilaginous bitter.

Lichen.
Murray, *g.* 1202. *Cryptogamia, algæ, lichenes.*
*Sp.* 50. Lichen islandicus. *Lond. Dub. Ed.*
Iceland moss. Eryngo-leaved liverwort.

*Off.*—The plant.
Lichen. *Lond.*
Lichen islandicus. *Dub. Ed.*

This is a perennial lichen, very common in Iceland, but also found in the forests and dry sterile woods of Switzerland and Germany, growing upon stones and on the earth. It has dry coriaceous leaves, divided into lobes and laciniæ, which are again notched and subdivided, with elevated margins, beset with short, very minute, rigid, parallel hairs, and marked with white spots, reddish towards the points. Amongst the leaves are found peltated, somewhat excavated, shining, viscid bodies, internally of a brown colour: these are the pericarpiums. When fresh, the colour of this lichen is greenish-yellow, or greyish-brown; but when dried, greenish-white or grey. In Sweden principally, and in Germany, a variety is found, with smaller, tenderer, crisper leaves, destitute of hairs on the margin, of a paler lead colour, orange beneath. It is gathered in rainy weather, because it is then more easily detached from the stones. In the countries where it abounds, it is used for the nourishment both of cattle and of man. Mr Proust has analysed it with much success. A pound of dry lichen immersed in cold water soon resumed its fresh colour, and weighed two pounds two ounces, gave out a pale fawn colour to the water, but none of its bitterness. When previously powdered, it gives out a bitter, pale, yellow juice, losing about three *per cent.* in cold, and six in boiling water.

This bitterness resides in an extractive, which is employed in Iceland to dye a brown colour. By boiling lichen a quarter of an hour, it becomes sufficiently tender for use as an esculent vegetable. Lichen cooked in this manner has a kind of membranous elasticity, peculiar to some of the algæ and fungi; and after being dried, has only to be moistened with boiling water to resume this elasticity. Its appearance is not very prepossessing, having an unequal yellow colour, and a slight marine smell. A pound of dry lichen by boiling weighs three pounds, and when dried again, is reduced to two-thirds of a pound.

The decoction has a clear yellow colour, and a slightly bitter taste, which, even when made with eight waters, on cooling becomes a tremulous jelly, without any viscidity. This jelly on standing, contracts, expresses the water, cracks, and dries into transparent angular fragments, of a deep red colour, insoluble in cold water, soluble in boiling water, from which it is precipitated by infusion of galls. By nitric acid it is converted into oxalic acid. The insoluble part dissolves readily in nitric acid, forming oxalate of lime and oxalic acid, and is converted into a gelatinous pulp by potass.

According to this analysis, one hundred parts of dried lichen give, of

| | |
|---|---|
| Bitter extractive, | 3 |
| Matter soluble in hot water, | 33 |
| Matter insoluble in hot water, | 64 = 100 |

The last substance has much analogy with gluten, and the second with starch, particularly in the remarkable property of being precipitated by infusion of galls. It differs from it, however, in not being glutinous, and in the solid matter of the jelly contracting and separating from the fluid, as curd does from whey.

*Medical use.*—From the analysis of this lichen, it appears to consist principally of a nutritious substance, combined with a bitter; and on the combination of these, its medical virtues probably depend. It is used, according to Arnemann,

1. In cough with expectoration, threatening to terminate in consumption; after neglected catarrhs, the consequence of peripneumony, when the expectoration becomes more copious and purulent.
2. In emaciation from measles, (Schoenheide;) from wounds and ulcers with great discharge, (Plenk;) after salivation; and from actual ulcers in the lungs, when there is no fever, (Scopoli,) especially after neglected colds, or from translated morbid matter. In a

high degree of the disease it does little good, but the night sweats are diminished by it, (Millin.) In pituitous phthisis it is of great service.

4. In hæmoptysis, (Frize.)
5. In chincough, (Tode.)
6. In diabetes, as a tonic and palliative remedy.

It is commonly exhibited in decoction with water, broth, or milk, after the bitter has been extracted from it by steeping it in warm water; or in substance, boiled in chocolate or cocoa, or made into a jelly with boiling water. Half an ounce, or an ounce, must be used daily, and continued for some time. Proust disbelieves its specific virtues, but recommends it strongly as an article of diet in times of scarcity, and as a very convenient antiscorbutic vegetable in long sea voyages.

*Sp.* 115. LICHEN ROCELLA. *Dub.*
Orchill.

*Officinal.*—Litmus, turnsole.
LITMUS, lacmus tinctorius. *Dub.*

THIS lichen is found in Guernsey and Portland island, but it is from the Canary islands that it is chiefly obtained. It is not sold in the state of the plant merely dried, but manufactured by the Dutch into a paste, called *Litmus, Orseille en pate.* It is sold in square masses, about an inch in length, and half an inch in breadth and thickness, hard and brittle, having the appearance of a violet-coloured earth, with white spots. It has a violet smell, probably from the addition of oris root powder; and when tasted, speedily tinges the saliva, and gives a sense of heat in the mouth. This paste is prepared by making the lichen undergo a kind of fermentation in vats with urine and lime-water, forming the whole into a pulp, and then dividing it into squares to dry.

Litmus is chiefly used as a dye-stuff, and by chemists as a very valuable test of the presence of uncombined acids. I must frankly confess my ignorance of the grounds upon which the Dublin college have introduced it into their *Materia Medica.* The translator of the Pharmacopœia merely says, "it "has been used medicinally with an intention of allaying the "tickling attendant on phthisis, and in hysterical coughs."

LINUM.

Willd. *g.* 590. Smith, *g.* 163. *Pentandria Pentagynia.*—Nat. ord. *Gruinales.*

*Sp.* 1. Willd. Smith. LINUM USITATISSIMUM. *Ed. Lond. Dub.*

Common flax.

*Off.*—The seed.

SEMINA LINI USITATISSIMI. *Ed. Lond.*

SEMINA LINI. *Dub.*

THIS valuable annual plant is said to have come originally from those parts of Egypt which are exposed to the inundations of the Nile. It now grows wild in the fields in the south of England, and is cultivated in large quantities. It flowers in July.

Lintseed contains about one-fifth of mucilage, and one-sixth of fixed oil. The mucilage resides entirely in the skin, and is separated by infusion or decoction. The oil is separated by expression. It is one of the cheapest fixed oils; but is generally rancid and nauseous, and unfit for internal use. The cake which remains after the expression of the oil contains the farinaceous and mucilaginous part of the seed, and is used in fattening cattle, under the name of Oil-cake.

*Medical use.*—Lintseed is emollient and demulcent. The entire seeds are used in cataplasms. The infusion is much employed as a pectoral drink, and in ardor urinæ, nephritic pains, and during the exhibition of corrosive sublimate.

*Sp.* 26. Willd.; *sp.* 4. Smith. LINUM CATHARTICUM. *Dub. Lond.*

Purging flax. Mill-mountain.

*Officinal.*—Herba. The herb.

LINUM CATHARTICUM. *Lond.*

HERBA LINI CATHARTICI. *Dub.*

THIS is an annual indigenous plant, found wild on dry meadows and pastures. It flowers from June to August. It is extremely bitter. An infusion in water or whey of a handful of the fresh herb, or a drachm of it in substance, when dried, is said to purge without inconvenience.

LITHRUM SALICARIA. *Dub.*

Willd. *g.* 951, *sp.* 1. Smith, *g.* 223, *sp.* 1. *Dodecandria Monogynia.*—Nat. ord. *Calycanthemæ.*

Purple-spiked Willowstrife, Loosestrife.

*Officinal.*—The herb.

HERBA LITHRI SALICARIÆ. *Dub.*

THIS perennial plant is indigenous, and grows in marshes, and on the banks of rivers. The dried leaves have a herbaceous taste, somewhat astringent, and when moistened soon give out a ropy mucilage. Hence it is difficult to swallow the powder mixed with water. An ounce of the plant yielded to Sagar three drachms of watery, and only two drachms and

24 grains of spiritous extract, and the former was more disagreeably austere and exsiccative.

The decoction of this plant has been long celebrated in Ireland in diarrhœas. In the same disease, it is a popular remedy in Sweden; and De Haen and Stork and others have given it with success in laxity of the intestines from an accumulation of sordes. After premising a purgative, a drachm or more of the powder may be given morning and evening, or three times a-day. A decoction also of the plant or root may be given in diarrhœa or dysentery. Its properties are evidently mucilaginous and astringent.

Lytta vesicatoria.—See Cantharis.

Magnesiæ sulphas, s. s. Sulphas magnesiæ purificata. *L.*
Sulphas magnesiæ. *Ed.*
Sulphas magnesiæ, *olim* Sal catharticum amarum. *Dub.*
Sulphate of magnesia. Epsom salt. Bitter purging salt.

This salt is contained in several mineral springs, and also in sea-water, from which it is obtained by evaporation. It crystallizes in tetrahedral prisms, has a very bitter taste, and is soluble in its own weight of water at 60°, and in three-fourths of its weight of boiling water. Sulphate of magnesia, when perfectly pure, effloresces; but that of commerce generally contains foreign salts, such as the muriate of magnesia, which renders it so deliquescent that it must be kept in a close vessel or bladder. By the action of heat it undergoes the watery fusion, and loses its water of crystallization, but does not part with its acid. It is decomposed by baryta, strontia, the alkalis, and all the salts formed by these salifiable bases, excepting the alkaline muriates; and by the nitrate, muriate, and carbonate of lime.

*Medical use.*—It is a mild and gentle purgative, operating with sufficient efficacy, and in general with ease and safety, rarely occasioning any gripes, sickness, or the other inconveniences of resinous purgatives. Six or eight drachms may be dissolved for a dose in a proper quantity of common water; or four, five, or more, in a pint or quart of the purging mineral waters. These solutions may likewise be so managed as to promote evacuation by the other emunctories; if the patient be kept warm, they increase perspiration: and by moderate exercise in the cool air, the urinary discharge. Some allege that this salt has a peculiar effect in allaying pain, as in colic, even independently of evacuation.

It is also used in great quantities for the preparation of the carbonate of magnesia.

MALVA SYLVESTRIS. *Ed. Lond.*
Willd. *g.* 1290, *sp.* 43. Smith, *g.* 317, *sp.* 1. *Monadelphia Polyandria.*—Nat. ord. *Columniferæ.*
Common mallow.

*Off.*—The leaves and flowers.
*a)* HERBA MALVÆ SYLVESTRIS. *Ed.*
MALVA. *Lond.*
*b)* FLORES MALVÆ SYLVESTRIS. *Ed.*

THIS is a perennial plant, common in Britain, under hedges, near footpaths, and among rubbish. It flowers from May to August.

The whole plant abounds with mucilage. The leaves were formerly of some esteem in food for loosening the belly; at present, decoctions of them are sometimes employed in dysenteries, heat, and sharpness of urine, and in general for obtunding acrimonious humours; their principal use is in emollient glysters, cataplasms, and fomentations.

MANGANESIUM. *Dub.*
Manganese; the black oxide of Manganese.

THIS metallic oxide is now, for the first time, introduced into the materia medica. It is to be regretted that the Dublin college has given, as the officinal name of the oxide, that which scientifically belongs to the metal.

Manganese is found,
I. Metallic.
1. Native manganese.
II. Oxidized. Grey ore, containing its black oxide.
1. Foliated grey ore.
2. Radiated.
3. Compact.
4. Earthy.
III. Sulphuretted. The black ore.
IV. Carbonated. The red ore.

The varieties of the grey ore are the most common. It is found in greatest purity at Exeter, and at Howth near Dublin. It is chiefly used for destroying the colour which iron imparts to glass, and has hence been called Glass-maker's soap, and for preparing the oxymuriatic acid, now so much used in bleaching. The recent application of the same acid to the destruction of contagion, and to other medical purposes, has procured the black oxide of manganese a place in the list of the materia medica.

MANNA. Succus concretus Fraxini orni. *Lond. Dub. Ed.*
Manna, the concrete juice of the manna ash.

The tree which is indicated as yielding the officinal manna is the *Fraxinus ornus.* Willd. *g.* 1908, *sp.* 15. *Polygamia Diœcia.*—Nat. ord. *Ascyrbideæ.* It is obtained from other species of fraxinus besides the ornus, and especially from the rotundifolia. It is principally collected in Calabria, Apulia, and Sicily. In the warmest season of the year, from the middle of June to the end of July, a clear juice exudes from the stem and branches of these trees, which, when naturally concreted on the plants, and scraped off, is called Manna in the tear; but if allowed to exude on straws, or chips of wood fastened to the tree, it is called canulated, or flaky manna. The common or fat manna is got by incisions made after the spontaneous exudation is over, and is in larger masses, and of a redder colour. The best Calabrian manna is in oblong, light friable pieces or flakes, of a whitish or pale yellow colour, and somewhat transparent. The inferior kinds are moist, unctuous, and dark coloured.

Denon, in his travels in Sicily, has given an account of the manna produced there, which, though less known, is dearer than that of Calabria, and preferred to it. As soon as the trees are seven or eight years old, and about eight feet high, horizontal incisions are begun to be made in the bark one over the other, from the surface of the earth to the top of the tree. The operation is repeated every two days, from the 15th July, until the rains or fogs of autumn suspend the circulation or deteriorate the quality of the saccharine juice which exudes. The liquor first appears like a white froth extremely light, pleasing to the palate, and of a very agreeable flavour. The heat of the sun coagulates this frothy juice, and gives it the form of stalactites. The glutinous and more highly coloured liquor that now distils from the wounds is received on leaves of the Indian fig, placed for the purpose at the foot of the tree. This too becomes at length congealed by the sun, and being then taken up in lumps, forms what is called *Fat manna*, which is heavier, more purgative, and of much less value.

The wood of the manna ash is hard, heavy, and bitter, and the decoction of it is said to be aperient, and of great efficacy in the dropsy.

Olivier mentions different kinds of manna found in Persia, one called *Cherker*, more purgative than Calabrian manna, got from the north of Khorassan and Little Tartary; another very good to eat, which must be collected before sun-rise, because it melts with the heat of the sun; and a third, called *Therenjabri*, the product of the *Hedysarum alagi*, in the warmest provinces of Persia and Arabia. It is gathered during a

month at the end of summer. It is found in all parts of the plant, especially the young shoots, in little round grains which have the taste and consistence of well-crystallized sugar, and like it crackle under the teeth. It is very common, and found in all the druggists' shops of Persia, but commonly mixed with leaves and other impurities. It is not more purgative than honey, and is much used as a pectoral.

Manna appears often to be formed and deposited by insects. Manna is said to be sometimes counterfeited by a composition of sugar and honey, mixed with a little scammony: there is also a factitious manna, which is white and dry, said to be composed of sugar, manna, and some purgative ingredient, boiled to a proper consistence. This may be distinguished by its weight, solidity and transparent whiteness, and by its taste, which is different from that of manna.

According to Neumann, manna dissolves in alcohol. On setting the solution in a digesting heat, it gradually deposites 5-8ths of the manna, of a fine white colour, light, spongy, and in some degree crystalline, melting instantly upon the tongue, and impressing an agreeable sweet taste, without any of the nauseousness of the manna. By further evaporation 1-4th more is obtained, similar to manna; and on continuing the evaporation, a thick extract is formed, of the consistence of a balsam, which can scarcely be fully exsiccated, but continues moist, and resembles civet grown brown by age. This extract, which is about 1-8th, contains all the nauseous matter of the manna. The experiments which I have made verify these observations. The quantity of matter which a hot alcoholic solution of manna deposites on cooling is various: a saturated solution concretes into a perfectly dry, white, spongy, crystallized mass. When much less concentrated, it deposites a congeries of most beautiful snow-white acicular crystals. A saturated solution in boiling water also forms a solid crystallized mass on cooling. Fourcroy says, that when a solution of manna is clarified with whites of eggs, and sufficiently concentrated, crystals of sugar may be obtained from it. But with Dr Thomson the experiment did not succeed: its crystals were always acicular, and more difficultly formed.

*Medical use.*—Manna is a mild agreeable laxative, and may be given with safety to children and pregnant women: nevertheless, in some particular constitutions, it acts very unpleasantly, producing flatulency, and distension of the viscera: these inconveniences may be prevented by the addition of any grateful warm aromatic. Manna operates so weakly as not to produce the full effect of a cathartic, unless taken in large doses; and hence it is rarely given by itself with this inten-

tion. It may be commodiously dissolved in the purging mineral waters, or joined with the cathartic salts, senna, rhubarb, or the like.

MARRUBIUM VULGARE. *Ed. Lond. Dub.*
*Willd. g.* 1111, *sp.* 8. Smith, *g.* 270, *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*
White horehound.

*Off.*—The leaves.
HERBA MARRUBII VULGARIS. *Ed.*
FOLIA MARRUBII ALBI. *Dub.*
MARRUBIUM. *Lond.*

THIS is a perennial plant, which grows wild on road-sides, and among rubbish, and flowers in July. The leaves have a very strong, not disagreeable smell, and a roughish, very bitter taste. Neumann got from 480 grains, 270 watery, and 30 alcoholic extract, and inversely 150 alcoholic, and 140 watery. They promote the fluid secretions in general, and liberally taken, loosen the belly.

MEL. *Lond. Dub. Ed.*
Honey.

THIS is a well-known substance; and although it is most probably of vegetable origin, it is not procured in any quantity except as an animal excretion from the bee (apis mellifica.) This industrious insect, in the summer-time, flies from flower to flower, to collect the sweet juice secreted in them. When sufficiently loaded, it returns to its hive, where it deposites the honey, as a winter's supply, in the cells of the comb it has prepared of wax to receive it. What change it undergoes in the body of the insect is unknown; but it is certain that honey varies very much, according to the nature of the plants from which it is collected.

The best honey is that which is freest from colour, and contains the largest grains when it concretes. For medical use, it should also be as free of flavour as possible. That obtained from young bees, and which flows spontaneously from the combs, is the purest and finest, and is known by the name of Virgin honey. When separated from the wax by expression, it is less pure; and there is another sort still inferior, obtained by heating the combs before they are put into the press.

Honey consists principally of sugar, but it also probably contains mucilage and an acid, and is often impregnated with the essential oil of the flowers from which the bees have gathered it, as in the perfumed honey of the Crimea. In

some parts of Asia and America, poisonous honey is met with from the bees feeding on poisonous flowers. Neumann exsiccated honey in the water-bath : the vapour which arose, he says, took fire on the approach of a candle, and diffused its smell widely; and the liquor which was condensed was manifestly impregnated both with the smell and taste of honey, and amounted to three ounces, from eight of honey. Dissolved in water, it undergoes the vinous fermentation, forming mead. Treated with alcohol, Proust says it may be separated into two kinds, one liquid, and the other crystalline. Cavellazzi obtained crystals of sugar from it, by saturating its acid with carbonate of lime; and it is converted into oxalic acid by the action of nitric acid.

*Medical use.*—From the earliest ages, honey has been employed as a medicine. Besides the general properties of saccharine bodies, it possesses others peculiar to itself, probably depending on the presence of an acid. For internal use, sugar is commonly to be preferred, as honey, in some constitutions, produces gripes and colic pains. From its stimulus, however, it forms an excellent gargle, and facilitates the expectoration of viscid phlegm; and it is sometimes employed as an emollient application to abscesses, and as a detergent to ulcers. It is also preferable to sugar in forming electuaries, as it is not so apt to crystallize.

MELALEUCA LEUCADENDRON. *Ed. Dub.*
MELALEUCA CAJUPUTI. *Lond.*
Willd. *g.* 1428. *Species nova. Polyadelphia Polyandria.*
—Nat. ord. *Hesperideæ.*
The broad-leaved cajeput tree.

*Off.*—The essential oil called Cajeput oil.
OLEUM VOLATILE MELALEUCÆ LEUCADENDRI. *Ed.*
OLEUM CAJUPUTI, oleum essentiale. *Lond.*
OLEUM CAJEPUT. *Dub.*

THE tree which furnishes the cajeput oil is frequent on the mountains of Amboyna, and the other Molucca islands. Drs Maton and Smith have lately examined specimens of this tree, which correspond with Rumphius, tab. 17, vol. ii.; and, as an unclassified species, have named it Melaleuca cajuputi. But, as Thunberg says, it is got from the leucadendron, perhaps both species yield it. Indeed, Rumphius himself would lead us to the same opinion. The oil is obtained by distillation from the dried leaves, and is prepared in great quantities, especially in the island of Banda, and sent to Holland in copper flasks. As it comes to us, it is of a green colour, very limpid, lighter than water, of a strong smell, resembling

camphor, and has a strong, pungent taste, like that of cardamoms. It burns entirely away, without leaving any residuum. It is often adulterated with other essential oils, coloured with the resin of milfoil. In the genuine oil, the green colour depends on the presence of copper; for, when rectified, it is colourless.

*Medical use.*—Like other aromatic oils, it is highly stimulating, and is principally recommended in hysteria, epilepsy, flatulent colic, and paralysis of the tongue. The dose is from one to four drops on a lump of sugar.

It is applied externally, where a warm and peculiar stimulus is requisite; and is employed for restoring vigour after luxations and sprains; and for easing violent pain in gouty and rheumatic cases, in toothach, and similar affections.

MELISSA OFFICINALIS. *Ed.*

Willd. *g.* 1118, *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*

Balm.

*Off.*—The herb.

FOLIA MELISSÆ OFFICINALIS. *Ed.*

BALM is a perennial plant, which grows wild on the Alps and Pyrennees, and is frequently cultivated in our gardens. It has a pleasant smell, and a weak, roughish, aromatic taste. The young shoots have the strongest flavour; the flowers, and the herb itself, when old, or produced in very moist rich soils, or rainy seasons, are much weaker, both in smell and taste.

It is principally used in the form of a watery infusion, which is drunk in the manner of tea.

MENISPERMUM COCCULUS. *Ed.*

Willd. *g.* 1826, *sp.* 7. *Diœcia Dodecandria.*—Nat. ord.

Cocculus Indicus.

*Off.*—The berry.

BACCÆ MENISPERMI COCCULI.

THIS tree is a native of Ceylon, Malabar, Java, and other places of India. The nuts are about the size of large peas, of a grey colour, and wrinkled surface. They contain a kidney-shaped seed, within a very thick shell. The seed is intensely bitter, and very acrid. M. Boullay analysed them, and found them to contain about half their weight of a concrete waxy oil, albumen, a particular colouring matter, a new bitter poisonous principle, which he has named *Picro-*

*toxine*, fibre and various saline matters. The picrotoxine acts as a poison, resembles camphor in its action, but is much more powerful. The cocculus indicus is used to intoxicate fishes in order that they may be caught; and it is said to be employed by some porter brewers to give bitterness to their beer, to render it more intoxicating. An ointment made with it has long been a domestic remedy in some places to kill vermin on the head, and is successfully applied in cases of tinea capitis.

MENTHA.

Willd. *g.* 1102. Smith, *g.* 262. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*

*Sp.* 7. Willd. *sp.* 3. Smith. MENTHA VIRIDIS. *Lond. Dub.* Spearmint.

*Officinal.*—The plant.

MENTHA VIRIDIS. *Lond.*

FOLIA MENTHÆ SATIVÆ. *Dub.*

SPEARMINT is perennial, and a native of Britain. It flowers in August. The leaves have a warm, roughish, somewhat bitter taste, and a strong, not unpleasant, aromatic smell.—Their virtues are stomachic and carminative.

*Sp.* 13. Willd. *sp.* 4. Smith. MENTHA PIPERITA. *Ed. Dub. Lond.*

Peppermint.

*Off.*—The plant.

HERBA MENTHÆ PIPERITÆ. *Ed.*

MENTHA PIPERITA. *Lond.*

HERBA MENTHÆ PIPERITIDIS. *Dub.*

THIS species of mint is also perennial, and a native of Britain, where it is cultivated in very great quantities, for the sake of its essential oil. It flowers in August and September.

The leaves have a strong, rather agreeable smell, and a pungent, aromatic taste, somewhat resembling that of pepper, and accompanied with a peculiar sensation of coldness.

Its predominant constituents are essential oil and camphor, both of which rise in distillation, and are combined in what is called Oil of Peppermint.

*Medical use.*—Peppermint is principally used as a carminative and antispasmodic. The distilled water is a domestic remedy for flatulent colic, and the essential oil is often given with advantage, in doses of a few drops, in cramps of the stomach.

*Sp.* 20. Willd. *sp.* 12. Smith. MENTHA PULEGIUM. *Ed. Lond. Dub.*

Penny-royal.

*Off.*—The herb.

HERBA MENTHÆ PULEGII. *Ed.*

PULEGIUM. *Lond. Dub.*

THIS is also perennial, and a native of Britain. It flowers in September. In its sensible qualities it is warm, pungent, and aromatic, somewhat similar to spearmint, but less agreeable. It is seldom used.

MENYANTHES TRIFOLIATA. *Ed. Lond. Dub.*

Willd. *g.* 299. *sp.* 4. Smith, *g.* 84, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Rotaceæ.*

Buckbean, Marsh trefoil.

*Off.*—The leaves.

FOLIA MENYANTHIS TRIFOLIATÆ. *Ed.*

MENYANTHES. *Lond.*

TRIFOLIUM PALUDOSUM. *Dub.*

THIS perennial plant is very common in marshy situations, and is one of the most beautiful of our native flowers. It flowers in June and July.

The leaves grow, by threes, on footstalks. They are excessively bitter, and their bitterness is extracted by infusion. They are said to be sometimes used in brewing ale, and that one ounce will go as far as half a pound of hops.

*Medical use.*—A drachm of them in powder purges and vomits. In infusion or extract, they have been recommended in intermittents, and in several cachectic and cutaneous diseases. The dose of the extract is from ten to twenty grains.

MOMORDICA ELATERIUM. *Lond. Dub.*

*Monoecia Syngenesia.* Willd. *g.* 7139, *sp.* 13.—Nat. ord. *Cucurbitaceæ.*

Wild cucumber.

*Off.*—The fresh fruit when almost ripe.

*a)* POMA ELATERII. Poma recentia. *Lond.*
FRUCTUS ELATERII. *Dub.*

*b)* ELATERIUM. *Ed.*

THIS plant is a native of the south of Europe, and is perennial. When cultivated in this country it does not survive the winter. The fruit is oblong, about an inch and a half long, and an inch in diameter. It is of a green colour, and beset with stiff hairs. When nearly ripe, it bursts on a slight touch, separates from its stalk, and sheds its seeds with great violence. From this circumstance it was named by the

Greeks *Elaterium*, which name was also applied to the fecula of the juice of the fruit, the only preparation used in medicine, and is now used in that sense by the Edinburgh College.

*Medical use.*—In a few grains it operates as a drastic purgative, and was sometimes used in dropsies. It is high priced and seldom used, though lately recommended by Dr Ferriar.

MORUS NIGRA.

*Monoecia Tetrandria.* Willd. *g.* 1664, *sp.* 5.—Nat. ord. *Scabridæ.*

Mulberry tree.

*Off.*—The fruit.

BACCÆ MORI. *Lond.*

THIS tree, which is supposed to have come originally from Persia, bears the cold of our winters, and ripens its fruit in England. The fruit has the same properties with other subacid fruits. Its juice contains tartaric acid.

MOSCHUS. *Ed. Dub.* Concretum sui generis. *Lond.*

Musk.

THE musk animal, Moschus Moschiferus, is an inhabitant of the most elevated region of Asia, particularly of the Altayan Alps, and the mountains which divide Thibet from China. It is gentle and timid, and its chace is difficult and dangerous. It is about three feet in length, and in its general form resembles the deer tribe. In the male, behind the navel, and before the prepuce, there is situated an oval bag, flat on one side, and convex on the other, about three inches long, and two broad, projecting about an inch, and having a small open orifice, beset with short hairs. In the young animal it is empty, but in the adult it is filled with a secreted matter, known by the name of Musk. When the bag becomes too full, the animal expresses part of its contents, by rubbing itself against stones or trees. The musk expressed in this manner is said to be the purest, but none of it probably reaches this country. The best musk is brought from Tonquin, an inferior sort from Agria and Bengal, and a still worse from Russia.

Fine musk comes to us in round thin bladders, which are generally about the size of a pigeon's egg, covered with short brown hairs, lined with a thin brown membrane, well filled, and without any appearance of having been opened. The musk itself is dry, with a kind of unctuosity, of a dark reddish brown or rusty blackish colour, in small round grains, with very few hard black clots, and perfectly free from sandy, or other visible foreign matter. If chewed, and rubbed with

a knife on paper, it looks smooth, bright, yellowish, and is free from grittiness. Laid on a red-hot iron, it catches flame, and burns almost entirely away, leaving only an exceedingly small quantity of light greyish ashes. The largest and fullest bag scarcely contains more than two drachms of musk.

Its taste is somewhat bitterish, and its smell extremely powerful and peculiar. Neumann got from thirty grains of musk twelve of watery and four of alcoholic extract; and inversely, ten of alcoholic, and six of watery. Its smell and taste were elevated in distillation with water, but not with alcohol. Neither the fixed nor volatile oils dissolve it.

The very great price of musk has given rise to many modes of adulterating it. To increase its weight, sand, and even particles of lead, are introduced through very small openings into the bags. The real musk is frequently abstracted from the bag, and its place supplied with dried blood, coarsely powdered, or some mixture with asphaltum. These adulterations are to be detected by discovering that the bag has been opened. The presence of blood is also known by the fetid smell it emits when heated sufficiently, and by the formation of ammonia, when rubbed with potass. Asphaltum is known by its shining fracture, and melting on hot iron, while musk is converted into charcoal. But there are even artificial bags filled with a composition containing some real musk. These are in general thicker, and covered with longer hair, and want the internal brown membrane which lines the real musk-bag.

*Medical use.*—Musk is still believed by some to be a medicine of very great efficacy. According to them, properly administered, it sometimes succeeds in the most desperate circumstances; it raises the pulse, without heating much; allays spasms, and operates remarkably on the brain, increasing the powers of thought, sensation, and voluntary motion.

It may be employed in every instance of typhus fever, especially when attended with delirium, or spasmodic affection of any particular organ, or of the whole system, or subsultus tendinum, &c. It is also used with the greatest benefit in exanthematous and phlegmonic diseases, accompanied with typhoid fever; and in many spasmodic affections, as chincough, epilepsy, trismus, &c.

It is most conveniently given in substance in powder, in doses of three grains or upwards, repeated every one or two hours. Its best preparation is the tincture.

Murias.

Muriate is the generic term for those secondary com-

pounds which contain muriatic acid. Their general properties have been already mentioned.

The muriates may be divided into three families;

1. Alkaline muriates,—soluble in water, fusible and vaporizable without decomposition, forming no precipitate with alkaline carbonates.

2. Earthy muriates,—generally soluble in water, decomposible by heat, forming a white precipitate with alkaline carbonates.

3. Metalline muriates.—The muriatic acid is capable of combining with many metals, in two states of oxidizement. The muriates which contain the metal in the state of protoxide, are in general very acrid, and soluble both in water and in alcohol. The muriates which contain the metal in the state of peroxide are often insoluble, have a white colour, and contain an excess of base, or are submuriates. The muriates are also the most volatile of the metalline salts, and often rise undecomposed in sublimation or distillation.

The officinal muriates are the muriate of ammonia and muriate of soda; and the preparations are the muriate of iron, of ammonia and iron, of barytes, of mercury, mild and corrosive, and of antimony. An account of each of these will be found under their respective bases, except the first, which we insert here, having been omitted in its proper place.

MURIAS AMMONIÆ. *Ed.*
AMMONIÆ MURIAS, s. s. Murias ammoniæ. *Lond.*
SAL AMMONIACUM, s. s. Murias ammoniæ. *Dub.*
Muriate of ammonia. Sal ammoniac.

MURIATE of ammonia is found native, especially in the neighbourhood of volcanoes. It was first prepared in Egypt from the soot of camel-dung by sublimation; but the greatest part of that now used is manufactured in Europe, either by combining ammonia directly with muriatic acid, or by decomposing the sulphate of ammonia by means of muriate of soda; or the muriates of lime and magnesia by means of ammonia.

In commerce, muriate of ammonia occurs, either sublimed in firm, round, elastic, concavo-convex cakes, or crystallized in conical masses. The latter commonly contain other salts, especially muriate of lime, which renders them deliquescent; and, therefore, the sublimed muriate of ammonia is to be preferred for the purpose of medicine.

Muriate of ammonia has an acrid, pungent, urinous taste. It is soluble in about three times its weight of water at 60°,

and in an equal weight at 212°. During its solution, it produces 32° of cold. It is also soluble in about 4.5 parts of alcohol. It is permanent in the ordinary state of the atmosphere. By a gentle heat, it may be deprived of its water of crystallization, and reduced to the form of a white powder. At a higher temperature it sublimes unchanged. Its crystals are either six-sided pyramids, aggregated in a plumose form, or still more commonly, four-sided pyramids. It consists of 32.75 muriatic acid, 25.00 ammonia, and 32.25 water. It is decomposed by the sulphuric and nitric acids; by baryta, potass, soda, strontia, and lime; by several secondary salts containing these acids or bases; and by those metalline salts whose bases form with muriatic acid an insoluble compound.

*Medical use.*—Muriate of ammonia is now seldom used internally. It was formerly supposed to be a powerful aperient and attenuant of viscid humours.

Externally applied, it is a valuable remedy. It may act in two ways.

1. By the cold produced during its solution.

It is from this cause that fomentations of muriate of ammonia probably prove beneficial in mania, apoplexy from plethora, lesions of the head, and in violent headachs. When used with this intention, the solution should be applied as soon as it is made.

2. By the stimulus of the salt.

On this principle we may explain its action as a discutient, in indolent tumours of all kinds, contusions, gangrene, psora, ophthalmia, cynanche, and in stimulating clysters. In some cases, as in chilblains, and other indolent inflammations, both modes of action may be serviceable. When first applied, the coldness of the solution will diminish the sense of heat and uneasiness of the part, and the subsequent stimulus will excite a more healthy action in the vessels.

Myristica moschata. *Ed. Lond.*

Myristica officinalis. *Dub.*

Willd. *g.* 1351, *sp.* 1. *Monoecia Monandria.*—Nat. ord. *Oleraceæ.*

The nutmeg tree.

*Off.*—Nutmeg; oil of nutmeg; oil of mace.

*a)* Nucleus myristicæ moschatæ. *Ed.*

Nuclei myristicæ. *Lond.*

Nux moschata. *Dub.*

*b)* Involucrum nuclei myristicæ moschatæ, *vulgo* macis. *Ed.*

Macis, Nucis moschatæ involucrum. *Dub.*

Oleum essentiale nucis moschatæ. *Dub.*
*d)* Oleum expressum nucis moschatæ. *Dub.*
Oleum expressum nucleorum myristicæ. *Lond.*

The tree which furnishes this elegant spice is a native of the Molucca islands. It is not, however, cultivated in any of them except Banda, from which all Europe has been hitherto supplied with mace and nutmeg. The entire fruit is about the size of a peach, and is marked with a longitudinal furrow. The external covering is smooth, fleshy and bitter. As the fruit ripens, this bursts, and discloses the mace, which is an oily membranous pulp, of a dark red colour, and aromatic flavour, divided into narrow branched slips. Within the mace is inclosed the nut, which consists of a brown, thin, hard shell, and a fatty parenchymatous kernel, of an oval shape. The fruit is gathered three times a-year. The external covering is separated on the spot, and the mace and nut carried home where they are carefully dried in the sun. After they are dried, the nutmegs are dipt in lime water, and the mace is sprinkled with salt water, probably to preserve them from the attacks of insects.

*Mace*, by drying, acquires a reddish-yellow colour. When good, it is flexible, thin, oily, of a deep colour, has a strong agreeable smell, and an aromatic, bitterish acrid taste. When brittle, divided into fewer slips, of a whitish, or a pale yellow colour, and of little smell or taste, it is to be rejected.

Neumann got from 7680 parts of mace, 2160 alcoholic, and 1200 watery extract; and inversely, 1920 watery, and 1440 alcoholic extract, with 300 of volatile oil heavier than water, which arose during the inspissation of the watery extract. The expressed oil of mace is less consistent than that of nutmegs.

*Nutmegs* are oval, flattened at both ends, of a grey-brown colour, and reticularly furrowed on the outside, of a yellow colour within, variegated with brown undulating lines, solid, hard, unctuous to the feel, and easily cut with a knife, and have a balsamic smell, and agreeable aromatic taste. The small round nutmegs are better than the large oval ones; and they should have a strong smell and taste, and should neither be worm-eaten, musty, nor variegated with black lines. Their activity is, however, confined to the dark-coloured veins, which are not apt to be worm-eaten.

Neumann got from 1920 parts of nutmeg, 480 of an oily alcoholic extract, and 280 watery, with 320 fixed oil: these two last were both insipid: and inversely, 600 watery extract, with 50 of fixed oil, which rose to the surface during the inspissation, and 10 of volatile oil which distilled over; and af-

terwards, 120 unctuous alcoholic extract, and 300 more of fixed oil. By expression 1920 gave 540 of oil, and afterwards 480 of watery extract, a pretty strongly tasted distilled water, and 80 unctuous alcoholic extract, with 60 of insipid fixed oil.

*Volatile oil of nutmeg.* By distillation nutmegs yield a considerable quantity of essential oil, of a whitish-yellow colour, lighter than water, and possessing the aromatic taste and smell in an eminent degree. In doses of a few drops, it is a powerful carminative and stomachic.

*Expressed oil of mace.* Nutmegs also yield by expression a considerable quantity of limpid yellow oil, which, on cooling, acquires a sebaceous consistence. They are first beaten to a soft paste in a warm mortar, then inclosed in a linen bag, exposed to the vapour of hot water, and squeezed in a press, of which the plates have been heated.

It is a mixture of the volatile oil on which the flavour depends, and of a fixed oil, of a white colour, without taste or smell; and as the properties which characterize it depend on the presence of the volatile oil, the denomination of Fixed oil is less correct than that of Expressed oil, given from the manner of its preparation.

In the shops we meet with three sorts of unctuous substances called Oil of mace, though really expressed from the nutmeg. The best is brought from the East Indies, in stone jars; this is of a thick consistence, of the colour of mace, and of an agreeable fragrant smell. The second sort, which is paler coloured, and much inferior in quality, comes from Holland, in solid masses, generally flat, and of a square figure. The third, which is the worst of all, and usually called Common oil of mace, is an artificial composition of suet, palm oil, and the like, flavoured with a little genuine oil of nutmeg. 7680 of the second sort yielded to Neumann 330 volatile oil heavier than water, 2880 of fluid expressed oil, and 4560 of solid but fusible sebaceous matter, perfectly insipid, inodorous, and of a chalky whiteness.

*Med. use.*—Both mace and nutmegs are rather to be considered as aromatic spices, than as articles of medicine. From the essential oil they contain, they are heating and stimulating; and they are added to other medicines for the sake of their agreeable flavour.

MYROXYLON PERUIFERUM. *Ed. Lond. Dub.*

Willd. *g.* 829, *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Lomentaceæ.*

Sweet-smelling balsam tree.

*Off.*—The balsam called Peruvian Balsam.
Balsamum myroxyli peruiferi. *Ed.*
Balsamum peruvianum. *Lond. Dub.*

This tree grows in the warmest provinces of South America, and is remarkable for its elegant appearance. Every part of it abounds with resinous juice; even the leaves are full of transparent resinous points, like those of the orange tree.

The balsam, as brought to us, is commonly of the consistence of thin honey, of a reddish-brown colour, inclining to black, an agreeable aromatic smell, and a very hot biting taste.

It is very often adulterated; and sometimes what is sold for Peruvian balsam is a spurious mixture of resin and essential oil, flavoured with benzoin. These frauds are not easily detected, and fortunately they are of little importance.

It is said to be obtained by boiling the cuttings of the twigs in water, and skimming off with a spoon the balsam, which swims on the top.

By incision this tree yields a much more fragrant white or colourless balsam, which, when inspissated by the heat of the sun, forms the red or dry balsam of Peru; but it is very rarely used in Britain, and almost never to be met with in our shops.

Peruvian balsam consists of a volatile oil, resin, and benzoic acid; it is, accordingly, entirely soluble in alcohol, and in essential oils. Water dissolves part of the benzoic acid, and fixed oil combines with the resin. It may be suspended in water by trituration with mucilage and yolk of egg.

*Medical use.*—Balsam of Peru is a very warm aromatic medicine, considerably hotter and more acrid than copaiva. Its effects are stimulating and tonic. Hence its use in some kinds of asthmas, gonorrhœas, dysenteries, suppressions of the uterine discharges, and other disorders proceeding from debility. It is also employed externally for cleansing and healing wounds and ulcers, and sometimes against palsies and rheumatic pains.

Myrrha, gummi-resina. *Dub. Ed.* Arboris nondum descriptæ gummi-resina. *Lond.*
Myrrh. The gum resin of a non-descript tree.

The tree which produces this gum-resin is not yet ascertained. Mr Bruce has given some reasons for supposing that it is a mimosa; but we may observe, that all the mimosas, with which we are sufficiently acquainted, furnish a pure gum, and not a gum-resin. The best myrrh is brought from Tro-

glodytitia, a province of Abyssinia, on the borders of the Red Sea; but what we receive comes from the East Indies, and is produced on the eastern coast of Arabia Felix.

The best myrrh is in the form of tears, of a yellow or reddish-yellow colour, becoming redder when breathed on; light, brittle, of an unctuous feel, pellucid, shining; presenting white semicircular striæ in their fracture; of a very bitter aromatic taste, and a strong, peculiar, not unpleasant odour. It is not good if whitish, dark coloured, black, resinous, ill-smelled, or mixed with impurities, which is too commonly the case.

Neumann ascertained that water and alcohol are both of them capable of taking up the whole of the taste and smell of the myrrh, the extract made by either after the other being insipid. The alcohol distilled from the tincture elevated none of the flavour of the myrrh; but during the inspissation of the decoction a volatile oil arose, containing the whole of the flavour of the myrrh, and heavier than water, while the extract was merely bitter. From 7680 parts of myrrh, he got 6000 watery extract, 180 volatile oil, and 720 alcoholic: and inversely, 2400 alcoholic, and 4200 watery. Braconnot found that myrrh chiefly consisted of a gum, differing from all others. 1. It acquires cohesion by heat, which renders it partly insoluble in water, when the solution is evaporated. 2. It furnishes ammonia by distillation, and azote with nitric acid. 3. It precipitates lead, mercury and tin from their solution. Myrrh also contains 2.3 parts in the 100 of a bitter, very fusible, resinous matter. I have observed that the tincture is transparent, and when poured into water, forms a yellow opaque fluid, but lets fall no precipitate, while the watery solution is always yellow and opaque; and that myrrh is not fusible, and is difficultly inflammable. Mr Hatchett found it soluble in alkalies.

Vauquelin obtained from the root of the *Andropogon Schoenanthus*, by means of alcohol, a thick brown oil, having an acrid, burning taste, like an essential oil, and exactly the smell of myrrh. It differs from myrrh chiefly in having less solidity; but Vauquelin thinks, that if it was united to a gummy matter, it would exactly resemble it. He does not suppose, however, that this is the plant which produces the myrrh of commerce, but considers it as a proof that myrrh is formed in various vegetables.

*Medical use.*—Myrrh is a heating stimulating medicine. It frequently occasions a mild diaphoresis, and promotes the fluid secretions in general. Hence it proves serviceable in cachectic diseases arising from inactivity of the system, and

is supposed to act especially upon the uterine system, and to resist putrefaction.

It is exhibited,

1. In substance, in the form of powder, or made up into pills, in doses of 10 to 60 grains.
2. Dissolved in water, as in Griffith's celebrated, but unchemical, myrrh mixture.
3. Dissolved in alcohol.

MYRTUS PIMENTA. *Ed. Lond. Dub.*

Willd. *g.* 973, *sp.* 28. *Icosandria Monogynia.*—Nat. ord. *Hesperideæ.*

Pimento tree.

*Off.*—The fruit of the Pimento, commonly called Jamaica Pepper.

FRUCTUS MYRTI PIMENTÆ. *Ed.*

BACCÆ PIMENTÆ. *Lond.*

PIMENTO; (Piper Jamaicense) baccæ. *Dub.*

THIS is a native of Jamaica, and grows in all the woodlands on the north side. Soon after the trees have blossomed, the berries become fit for gathering, without being suffered to ripen, as when ripe they are moist and glutinous, and therefore difficult to cure, and when dried become black and tasteless. The berries are dried by spreading them on a terrace, exposed to the sun for about seven days, during which time they gradually lose their green colour, and become of a reddish-brown.

The smell of this spice resembles a mixture of cinnamon, cloves, and nutmegs; its taste approaches to that of a mixture of the whole three; whence it has received the name of *allspice.*

Neumann ascertained that its flavour resides entirely in a volatile oil, heavier than water, and its pungency, in a resin or a substance soluble in alcohol, and insoluble in water. From 480 parts, he got 120 watery extract, 30 volatile oil, and 20 alcoholic extract; and inversely, 66 alcoholic, and 100 watery.

*Medical use.*—Pimento is a warm aromatic stimulant, and is much used as a condiment in dressing food. As a medicine, it may be advantageously substituted for the more costly spices, especially in hospital practice.

NICOTIANA TABACUM. *Ed. Lond. Dub.*

Willd. *g.* 379, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ.*

Tobacco.

*Off.*—The dried leaves.

FOLIA NICOTIANÆ TABACI.

FOLIA TABACI. *Lond.*

FOLIA NICOTIANÆ. *Dub.*

TOBACCO is an annual plant, a native of America, from whence it was brought into Europe, about the year 1560. It is now sometimes cultivated, for medicinal use, in our gardens; but in general it is imported from America in large quantities. The leaves are about two feet long, of a pale green colour while fresh, and when carefully dried of a lively yellowish tint. They have a strong disagreeable, narcotic smell, and a very acrid burning taste.

The active constituent of tobacco was supposed to be an essential oil; for, by long boiling, the decoction and extract of tobacco become almost inert; and by distillation, an oil is obtained from it, so active, that small animals are almost instantly killed, when wounded by a needle dipped in it.

Vauquelin has lately analysed tobacco, both in its fresh and prepared state. The expressed juice is manifestly acid, and contains a great quantity of albuminous matter, super-malate of lime, acetic acid, nitrate and muriate of potass, muriate of ammonia, a red matter soluble in alcohol and in water, which swells and becomes charred by heat, and an acrid principle on which its peculiar properties depend. The infusion of prepared tobacco is alkaline, and contains, beside the same principles, carbonate of ammonia, and muriate of lime, proceeding from the mutual decomposition of the muriate of ammonia and lime which is added to give it pungency. The principle to which the acrimony of tobacco is owing, is soluble in alcohol and in water, is volatile, but still may be concentrated by slowly evaporating its solution in water, and still more easily its tincture. Its volatility is also diminished by the malic acid with which it is combined. It is obtained in a state nearest to purity in the distilled water of the infusion of the dry, or of the expressed juice of the fresh plant. This water is colourless, but has the acrid smell and taste of tobacco smoke: with acetate of lead and nitrate of mercury, it forms white precipitates, soluble in acids, and with infusion of galls one soluble in alcohol and the alkalies. The principle on which the properties of tobacco depends seems not easily destructible, as it is the same in the dry and in the fresh plant, and is not destroyed by oxymuriatic acid.

*Medical use.*—On the living body, whether taken into the stomach in substance or solution, or into the lungs in the form of smoke, or applied to abraded surfaces, tobacco is ca-

pable of producing deleterious effects. It often proves virulently cathartic or emetic, and occasions intolerable cardialgia, anxiety and vertigo.

The system becomes easily habituated to the action of tobacco; and many people use very large quantities of it in several ways as a luxury, without experiencing any other bad effect than what arises from their being unable to relinquish it after the habit is confirmed.

As a medicine, it is exhibited in various forms:

1. In substance. When chewed, it causes an increased flow of saliva, and sometimes relieves the toothach; and reduced to powder, it proves an excellent errhine and sternutatory when snuffed up the nostrils.
2. In infusion in water or wine. Taken in such small doses as to have little effect on the stomach, it proves powerfully diuretic, and was employed by Dr Fowler, with very great success, in cases of dropsy and dysuria. It is also applied externally for the cure of psora, tinea, and other cutaneous diseases.
3. In the form of smoke, it is injected into the anus by means of a bellows of a peculiar construction. By acting as a stimulus to the rectum, it sometimes succeeds in reviving the vital powers in some kinds of asphyxia, and in evacuating the intestines in cases of obstinate constipation.

NITRAS.

NITRATE is the generic term for secondary compounds, which consist of nitric acid, combined with any base. Their general characters have been already mentioned. There are three families of nitrates.

1. Alkaline nitrates;—soluble in water; solubility increased by increase of temperature; crystallizable; forming no precipitate with alkaline carbonates. *Off.*—Nitrate of potass.

2. Earthy nitrates;—soluble in water; forming a white precipitate with alkaline carbonates.

3. Metallic nitrates; generally soluble, both in water and in alcohol; decomposable by heat furnishing nitric oxide gas, and leaving the metal oxidized to a maximum.

OLEA EUROPÆA. *Lond. Ed. Dub.*

Willd. *g.* 36, *sp.* 1. *Diandria Monogynia.*—Nat. ord. *Sepiariæ.*

The olive tree.

*Off.*—Olive oil. The fixed or expressed oil of the fruit.

Oleum fixum oleæ europææ. Ex fructu. *Ed.*
Oleum olivæ. Drupæ oleum expressum. *Lond.*
Oleum olivarum. *Dub.*

The olive tree is a native of the south of Europe and north of Africa. It is cultivated in France, Spain, and Italy, for the sake of its fruit, and the oil expressed from it. Olives, when fresh, have an acrid, bitter, and extremely disagreeable taste; but they are only eaten when pickled. They are first steeped for several days in a ley of wood-ashes, and then pickled in a strong solution of muriate of soda.

They are principally valued for the oil they afford by expression.

For this purpose they are gathered when fully ripe, and immediately bruised, and subjected to the press. The finest oil flows first, and a very bad oil is obtained by boiling the magma, which remains after expression in water. According to Baumé, they are gathered when sufficiently ripe: they are then dried, to deprive the mucilage, of which they contain a large quantity, of its water, and are expressed after being bruised, and moistened with a little water, to render the oil more fluid. By rest, the mucilage and water, which may have passed with it, separate. Olive oil is sometimes mixed with oil of poppy seeds: but by exposing the mixture to the freezing temperature, the olive oil freezes, while that of the poppies remains fluid; and as oils which freeze with most difficulty are most apt to become rancid, olive oil is deteriorated by the mixture of poppy oil.

Good olive oil should have a pale yellow colour, somewhat inclining to green, a bland taste, without smell, and should congeal at 38° Fahrenheit. In this country, it is frequently rancid, and sometimes adulterated.

*Medical use.*—Taken internally, it operates as a gentle laxative, and is given in cases of worms. It is also given in large quantities to mitigate the action of acrid substances taken into the stomach. It is used externally in frictions, in gargles, and in clysters; but its principal employment is for the composition of ointments and plasters.

Oniscus asellus. *Dub.*
*Insecta aptera.*

*Off.*—Slaters, killed by the vapour of alcohol.
Millepedæ, spiritus vini vapore enecatæ.

These insects are found in cellars, under stones, and in cold moist places; in warm countries they are rarely met with.

They have a faint disagreeable smell, and a somewhat pungent, sweet, nauseous taste.

Neumann got from 480 parts 95 watery and ten alcoholic extract; and inversely 52 alcoholic and 45 watery. Nothing rose in distillation with either.

Their medical virtues have been very much overrated.

ORIGANUM.

Willd. *g.* 1116, Smith, *g.* 273. *Didynamia Gymnospermia.* —Nat. ord. *Verticillatæ.*

*Sp.* 10. Willd. *sp.* 1. Smith. ORIGANUM VULGARE. *Lond. Dub.*

Common marjoram.

*Off.*—The herb.

ORIGANUM. *Lond.*

FOLIA ORIGANI. *Dub.*

THIS is a perennial plant, which is met with upon dry, chalky hills, and in gravelly soils, in several parts of Britain, and flowers in July and August. It has an agreeable smell, and a pungent taste, warmer than that of the garden marjoram, and much resembling thyme, with which it seems to agree in virtue. An essential oil distilled from it is kept in the shops, and is very acrid.

*Sp.* 15. Willd. ORIGANUM MAJORANA. *Ed. Dub.*

Sweet marjoram.

*Off.*—The plant.

HERBA ORIGANI MAJORANÆ. *Ed.*

HERBA MAJORANÆ. *Dub.*

SWEET marjoram is an annual plant, which grows wild in Portugal, but is cultivated in our gardens, principally for culinary purposes. It is a moderately warm aromatic, yielding its virtues both to aqueous and spiritous liquors by infusion, and to water in distillation.

OSSA. *Ed.*

Bones.

RECENT bones consist of about half their weight of phosphate of lime, a third of their weight of cartilage or gelatin, and one-tenth of carbonate of lime. They also contain a little fluate of lime, phosphate of magnesia, soda, and muriate of soda. M. Darcet has shown how a great deal of nourishment can be extracted from them, by removing the earthy salts by means of muriatic acid; but in pharmacy bones are only used for the preparation of phosphate of lime, by burning them,

and of phosphate of soda, and phosphate of antimony and lime, by decomposition.

Ovum. Phasianus Gallus. *Lond.*

Egg of the dunghill fowl.

From what country this useful bird originally came, is not ascertained. It is now domesticated almost every where, and furnishes one of the most wholesome and delicate articles of food.

The egg only is officinal. The shell consists principally of carbonate of lime, with a small quantity of phosphate of lime and animal matter. When burnt the animal matter and carbonic acid are destroyed, and we obtain a lime, mixed with a little phosphate of lime.

The contents of the egg consist of two substances, the white and the yolk. The white is albumen conbined with a little soda and sulphur. The yoke is also albuminous, but contains moreover a bland oil, and some colouring matter The yolk is sometimes used in pharmacy for suspending oily and resinous substances in water. The white is used for clarification.

Oxalis acetosella. *Lond.*

Willd. *g.* 918, *sp.* 25. Smith, *g.* 217, *sp.* 1. *Decandria Pentagynia.*—Nat. ord. *Gruinales.*

Common wood-sorrel.

*Off.*—The leaves.

Acetosella. *Lond.*

This is a small perennial plant, which grows wild in woods, and under shady hedges, and flowers in April and May. The leaves contain a considerable quantity of superoxalate of potass, and have an extremely pleasant acid taste. They possess the same powers with the vegetable acids in general, and may be given in infusion, or beaten with sugar into a conserve, or boiled with milk, to form an acid whey. The super-oxalate of potass is extracted in large quantities from them, and sold under the name of *Essential Salt of Lemons.*

Twenty pounds of the fresh leaves yielded to Neumann six pounds of juice, from which he got two ounces two drachms, and a scruple of salt, besides two ounces and six drachms of an impure saline mass.

Papaver.

Willd. *g.* 1015, *sp.* 4. Smith, *g.* 243. *Polyandria Monogynia.*—Nat. ord. *Rhœades.*

*Sp.* 5, Willd. *sp.* 4. Smith. PAPAVER RHŒAS. *Lond. Dub.* Corn-rose, or red poppy.

*Off.*—The flower.

PETALA RHŒADOS. *Lond.*

PETALA PAPAVERIS ERRATICI. *Dub.*

THIS species of poppy is annual, and very common in our corn fields. It flowers in June and July, and the petals give out a fine red colour when infused, and are supposed to possess slightly anodyne powers.

*Sp.* 7. Willd. *sp.* 8. Smith. PAPAVER SOMNIFERUM. *Ed. Lond. Dub.*

White Poppy.

*Off.*—Poppy heads.

*a)* CAPSULÆ PAPAVERIS SOMNIFERI. *Ed.*

CAPSULÆ PAPAVERIS ALBI. *Dub.*

CAPSULÆ PAPAVERIS, capsulæ maturæ. *Lond.*

*b*) OPIUM, Succus concretus papaveris somniferi. *Ed.*

OPIUM, capsularum immaturarum succus concretus (Turcicus.) *Lond.*

OPIUM, Succus concretus. *Dub.*

THE white poppy is also an annual, and is sometimes found wild in this country, but it is originally a native of the warmer parts of Asia. It flowers in July, and is frequently cultivated for the beauty and the variety of its flowers, and for its seeds. Some attempts have been made in this country to obtain opium from its capsules; and Mr Ball received a premium from the Society for encouraging the arts, for specimens of British opium, in no respect inferior to the best eastern opium. Mr Young, an ingenious surgeon-apothecary of this city, has also obtained it in considerable quantity. But we apprehend that the climate of this country is an insuperable obstacle to its becoming a profitable branch of horticulture.

The leaves, stalks, and capsules of the poppy, abound with a narcotic milky juice, which is partially extracted, together with a considerable quantity of mucilage, by decoction. The liquor, strongly pressed out, suffered to settle, clarified with whites of eggs, and evaporated to a due consistence, yields about one-fifth, or one-sixth of the weight of the heads, of extract, which possesses the virtues of opium in a very inferior degree, and does not come to this country, unless when used to adulterate the genuine opium.

A strong decoction of the dried heads, mixed with as much sugar as is sufficient to reduce it to the consistence of a syrup, becomes fit for keeping in a liquid form, and is the only

officinal preparation of the poppy. It is, however, a very unequal preparation, as the real quantity of opium it contains is very uncertain; and as a medicine, it is by no means equal to syrup, to which a certain quantity of solution of opium is added.

The seeds of the poppy are simply emulsive, and contain none of the narcotic principle. They yield a considerable quantity of fixed oil by expression.

*Off.*—Turkey opium; the concrete juice of the capsules before they are ripe.

OPIUM. *Ed. Lond. Dub.*

*Opium* is the inspissated juice of the poppy. In the evening several superficial longitudinal incisions are made in the capsules, when they are almost ripe, with a knife having from three to five blades. The juice which exudes during the night, next day after it has been thickened, by the heat of the sun, is collected by means of iron scrapers, and put into an earthen pot. The operation is repeated as long as the heads furnish juice in sufficient quantity, and the opium is worked into masses with a wooden spatula, in the heat of the sun, until it acquires the due degree of thickness, when the masses are covered with poppy or tobacco leaves.

Two kinds of opium are found in commerce, distinguished by the names of Turkey and East-India opium.

*Turkey opium* is a solid compact substance, possessing a considerable degree of tenacity; when broken, having a shining fracture and uniform appearance; of a dark-brown colour; when moistened, marking on paper a light-brown interrupted streak, and becoming brown when reduced to powder; scarcely colouring the saliva when chewed, exciting at first a nauseous bitter taste, which soon becomes acrid, with some degree of warmth; and having a peculiar heavy disagreeable smell. The best kind is in flat pieces, and besides the large leaves in which they are enveloped, they are covered with the reddish capsules of a species of rumex used in packing it. The round masses which have none of the capsules adhering to them are evidently inferior in quality. Opium is bad if it be soft or friable, mixed with any impurities, have an intensely dark or blackish colour, a weak or empyreumatic smell, a sweetish taste, or draw upon paper a brown continuous streak.

*East-Indian opium* has much less consistence, being sometimes not much thicker than tar, and always ductile. Its colour is much darker; its taste more nauseous, and less bitter; and its smell rather empyreumatic. It is considerably cheaper than Turkish opium, and is supposed to be of only

half the strength. One-eighth of the weight of the cakes is allowed for the enormous quantity of leaves with which they are enveloped. In the East Indies, when opium is not good enough to bring a certain price, it is destroyed under the inspection of public officers.

Opium is not fusible, but is softened even by the heat of the fingers. It is highly inflammable. It is partially soluble both in alcohol and in water. Neumann got from 1920 parts of opium, 1520 alcoholic, and afterwards 80 watery extract, 320 remaining undissolved; and inversely 1280 watery, and 200 alcoholic extract, the residuum being 440.

The solutions of opium are transparent, and have a brown or vinous colour. The watery solution is not decomposed by alcohol. A small quantity of matter, which, as far as my experiments go, is neither fusible nor remarkably inflammable, is separated from the alcoholic solution by water. I have also observed that the watery solution of opium, and the alcoholic, after it has been precipitated by water, does not redden vegetable blues, is not precipitated by acids or alkalies, but is precipitated copiously by carbonate of potass, muriate and super-nitrate of mercury, oxymuriate of tin, sulphate of copper, sulphate of zinc, acetate of lead, nitrate of silver, and red sulphate of iron. The precipitate in the last case was of a dirty brown colour, not resembling those by alkaline or astringent substances. The solutions of opium, especially the watery, are also copiously precipitated by infusion of galls. This precipitate seems to resemble that produced by cinchonin, and to be different from that produced by gelatine.

The narcotic virtues of opium are imparted by distillation to alcohol and to water, and they are diminished, or entirely dissipated, by long boiling, roasting, or great age. The part of opium which is not soluble either in water or in alcohol is albumen, according to Gren; caoutchouc, according to Bucholz; a virulent glutinous substance, according to Josse; and Proust says it contains wax. From experiments made some years ago, I concluded that it was perfectly similar to the gluten of wheat flour, or fibrine. Long ago it was proposed to separate the resinous parts of opium by the same process that the fibrine of wheat flour is obtained. The fact is, that if Turkey opium be kneaded in a large quantity of water, the soluble parts are removed, and there remains in the hand an adhesive plastic mass, of a paler colour, not fusible, but becoming ductile when immersed in hot water, inflammable, imparting some colour to alcohol, but not soluble in it. East-India opium, treated in the same way, is entirely

dissolved or diffused in the water, and leaves no plastic mass in the hand.

Upon the whole, it appears that the active constituent of opium, though not perfectly understood, is of a volatile nature, but sometimes fixed by its combination with the other constituents; that it is soluble both in water and in alcohol; that it is dissipated in the processes recommended for purifying opium by solution and evaporation; and that the attempts made by some pharmaceutists, to obtain a preparation of opium, which should possess only its sedative, without its narcotic effects, only succeeded in so far as they diminished its activity.

Neumann, Haller, and Tralles had all obtained crystals from opium, and Derosnes and Pagenstecher pointed out the method of procuring them in greater quantity.

By evaporating a watery solution of opium, to the consistence of a syrup, Derosnes obtained a precipitate, which was increased by diluting it with water. He dissolved this in hot alcohol, from which it again separated on cooling. When purified by repeated solutions, it crystallized in rectangular prisms, with rhomboidal bases, had no taste or smell, was insoluble in cold water, and soluble in 400 parts of boiling water, did not affect vegetable blues, was soluble in 24 parts of boiling alcohol, and 110 cold; soluble in hot ether and volatile oils, and separated from them as they cooled; very soluble in all acids, and highly narcotic.

M. Sertuerner, apothecary in Eimbeck in Hanover, published his first observations and discoveries regarding their nature in 1803, but they attracted little notice. He again published a fuller memoir in Gilbert's Annals, in January 1817, which was immediately translated into the French Annals, and confirmed by Gay-Lussac and Robiquet, and prosecuted still farther by Choulant at Dresden, and we think it not superfluous to give an extract of his experiments. He infused four ounces of powder of opium in repeated portions of cold distilled water, and filtrated the solution through cloth. It was evaporated in a glass vessel, with a gentle heat, to eight ounces; which, after standing eight days, deposited six grains of sulphate of potass. The remaining fluid was diluted with distilled water, and yielded a flocculent precipitate on the addition of caustic ammonia, which, after being washed successively with sulphuric ether, caustic ammonia, and alcohol, yielded three drachms of a fine brownish white powder, to which M. Sertuerner has given the name of *Morphium*, and which may be further purified by solutions in boiling alcohol and crystallization. It seemed to be perfectly free from ammonia, yet it possessed

all the characteristic properties of an alkali, colouring rhubarb brown, and fernambuc violet, and forming neutral salts with acids. It has a peculiar bitter astringent taste, and its solutions leave a red stain on the skin. Its crystals are very obtuse, single or double pyramids, with a square or long rectangular base, or prisms with a trapezoid base. It dissolves in 82 parts of boiling water, from which it crystallizes on cooling; in 36 of boiling and 42 of cold alcohol, and in 8 of sulphuric ether. The fluid from which the morphium was precipitated, after being heated to 40 R. to expel the ammonia, was filtered, and a solution of muriate of barytes (or of acetate of lead) added as long as there was any precipitate. The white precipitate, when washed and dried, weighed 7 drachms, and consisted of the barytes mixed with a new acid, to which M. Sertuerner has given the name of *meconic*, and which he separated by sulphuric acid. This mode of obtaining it has not succeeded with others, and its existence was doubted; but M. Choulant, by mixing the meconite of barytes with an equal weight of vitreous boracic acid, and subliming the meconic acid, which appears in the form of shining scales, of a fine white salt. Its taste is at first sour and cooling, but afterwards unpleasantly bitter. It reddens vegetable blues, and combines with alkalies and earths, and gives a cherry red colour to solutions of iron: its crystals are quadrangular tables, and it is soluble in twice its weight of water, and also in alcohol and ether.

The crystallizable substance detected in opium by Neumann, Haller and Tralles was an impure supermeconate of morphium, and Derosnes' salt of opium was the same compound in a purer state. Pagenstecher, taking advantage of Derosnes' observations, that it was soluble only in alcohol and acids, digested the residuum of laudanum with vinegar, and precipitated with potass.

The experiments hitherto made with morphium upon the animal economy do not prove satisfactorily that the narcotic powers of the opium reside exclusively in it. M. Sertuerner thought he saw violent effects, pain of stomach and vomiting from half a grain, three times repeated at intervals; but M. Orfila gave 10 or 11 grains to a dog without any effect. Six grains dissolved in vinegar caused a slight palsy of the hind legs, and 12 grains dissolved in weak acetic acid, applied to the cellular membrane, produced all the symptoms of poisoning by opium.

*Medical use.*—The action of opium on the living system has been the subject of the keenest controversy. Some have asserted that it is a direct sedative, and that it produces no

stimulant effects whatever ; while others have asserted as strongly, that it is a powerful, and highly diffusible stimulus, and that the sedative effects, which it undeniably produces, are merely the consequence of the previous excitement. The truth appears to be, that opium is capable of producing a certain degree of excitement, while the sedative effects which always succeed are incomparably greater than could be produced by the preceding excitement. The stimulant effects are most apparent from small doses. These increase the energy of the mind, the frequency of the pulse, and the heat of the body, excite thirst, render the mouth dry and parched, and diminish all the secretions and excretions, except the cuticular discharge, which they increase. These effects are succeeded by languor and lassitude. In larger doses, the stimulant effects are not so apparent; but the excitability is remarkably diminished, and confusion of head, vertigo, and sleep are produced. In excessive doses it proves a violent narcotic poison, exciting headach, vertigo, delirium, and convulsions, accompanied with a very slow pulse, stertorous breathing, and a remarkable degree of insensibility or stupor, terminated by apoplectic death. In one case, where I inspected the body after death, the inner membrane of the stomach was remarkably corrugated, and with some inflammation ; but as large doses of sulphate of zinc and flour of mustard had been also taken, no inference can be drawn from these appearances. The bad effects of an over-dose of opium are often prevented by the occurrence of vomiting, and they are best counteracted by making the patient drink freely of acids and coffee, and chiefly by not permitting him to yield to his desire of sleeping. By habit, the effects of opium on the body are remarkably diminished. There have been instances of four grains proving fatal to adults, while others have been known to consume as many drachms daily. The habitual use of opium produces the same effects with habitual dram-drinking ; tremors, paralysis, stupidity, and general emaciation : and like it can scarcely ever be relinquished.

In disease, opium is chiefly employed to mitigate pain, diminish morbid sensibility, procure sleep, allay inordinate actions, and to check diarrhœa, and other excessive discharges. It is contraindicated in gastric affections, plethora, a highly inflammatory state of the body, and determination of the blood to particular viscera.

In intermittents, it is said to have been used with good effect in every stage. Given even in the hot stage, it has been observed to allay the heat, thirst, headach, and delirium, to induce sweat and sleep, to cure the disease with less bark, and without leaving abdominal obstructions or dropsy.

In fevers of the typhoid type, accompanied with watchfulness or diarrhœa, it is extremely useful; but when not indicated by particular symptoms, it does harm, by augmenting thirst, and producing constipation.

Especially when combined with calomel, it has lately been much employed in inflammations from local causes, such as wounds, fractures, burns, absorption of morbid poisons, as in swelled testicle, &c. and even in active inflammations, accompanied with watchfulness, pain, and spasm, after blood-letting.

In small pox, when the convulsions before eruption are frequent and considerable, or when the accompanying fever is of the typhoid type, opium is liberally used. It is likewise given from the fifth day onwards; and is found to allay the pain of suppuration, to promote the ptyalism, and to be otherwise useful.

In dysentery, after the use of gentle laxatives, or along with them, opium, independently of any effect it may have on the fever, is of consequence in allaying the tormina and tenesmus, and in obviating that laxity of bowels which so frequently remains after that disease.

In diarrhœa, the disease itself generally carries off any offending acrimony, and then, or after purgatives, opium is used with great effect. Even in the worst symptomatic cases, it seldom fails to alleviate.

In cholera and pyrosis, it is almost the only thing trusted to.

In colic, it is employed with laxatives; and often prevents ileus and inflammation, by relieving the spasm. Even in ileus it is sometimes used to allay the vomiting, the spasms, and the pain.

It is given to allay the pain, and favour the descent of calculi, and to give relief in jaundice and dysuria proceeding from spasm.

It is of acknowledged use in the different species of tetanus; affords relief to the various spasmodic symptoms of dyspepsia, hysteria, hypochondriasis, asthma, rabies canina, &c. and has been found useful in some kinds of epilepsy.

In syphilis it is useful in combating symptoms, and in counteracting the effects resulting from the improper use of mercury.

It is found useful in certain cases of threatened abortion and lingering delivery, in convulsions during parturition, and in the after-pains and excessive flooding.

The administration of opium to the unaccustomed, is sometimes very difficult. The requisite quantity is wonder-

fully different in different persons, and in different states of the same person. A quarter of a grain will in one adult produce effects which ten times the quantity will not do in another; and a dose that might prove fatal in cholera or colic would not be preceptible in many cases of tetanus or mania. When given in too small a dose, it is apt to produce disturbed sleep, and other disagreeable consequences; but sometimes a small dose has the desired effect, while a larger one gives rise to vertigo and delirium, and with some constitutions it does not agree in any dose or form. Its stimulant effects are most certainly produced by the repetition of small doses, its anodyne by the giving of a full dose at once. In some it seems not to have its proper effect till after a considerable time. The operation of a moderate dose is supposed to last in general about eight hours from the time of taking it.

Externally, opium is used to diminish pain, and to remove spasmodic affections. It is found particularly serviceable in chronic ophthalmia, when accompanied with morbidly increased sensibility.

Opium may be exhibited,

1. In substance, made up in the form of a pill, lozenge, or electuary. Its most efficient form.
2. Dissolved in diluted alcohol, or white wine.
3. Dissolved in water, or watery fluids. Very perishable.
4. Dried and reduced to powder.

It is often given in combination with aromatics, astringents, emetics, bitters, camphor, soap, distilled waters, mucilage, syrups, acids, carbonate of ammonia, ether, acetate of lead, tartrate of antimony and potass, and unctuous substances. Some of these are certainly unchemical mixtures, for I find by experiment that the solutions of opium are copiously precipitated by astringents, the alkaline carbonates, and all the metallic salts.

PASTINACA OPOPONAX. *Lond.*

Willd. *g.* 558, *sp.* 3. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Opoponax.

*Off.*— A gum-resin.

GUMMI RESINA OPOPONACIS. *Lond.*

THIS plant is perennial, and grows wild in the south of Europe; but the gum-resin, which is said to be obtained by wounding the stalk or root, is brought from the Levant and

East Indies, sometimes in round drops or tears, but more commonly in irregular lumps, of a reddish yellow colour on the outside, with specks of white, inwardly of a paler colour, and frequently variegated with large white pieces. It has a peculiar strong smell, and a bitter, acrid, somewhat nauseous taste.

Neumann got from 480 parts, 166 alcoholic, and afterwards 180 watery extract ; and inversely, 226 watery, and 60 alcoholic. Both the water and alcohol distilled from it were impregnated with its flavour. It forms a milky solution with water, and yields a little essential oil on distillation. It is supposed to be an emmenagogue, but is rarely used.

PIMPINELLA ANISUM. *Ed. Lond. Dub.*

Willd. *g.* 562, *sp.* 8. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Anise.

*Off.*—The seeds.

SEMINA PIMPINELLÆ ANISI. *Ed.*

SEMINA ANISI. *Dub. Lond.*

ANISE is an annual umbelliferous plant, growing wild in Crete, Syria, and other places of the East. It is cultivated in some parts of France, Germany, and Spain, and may be raised also in England ; the seeds brought from Spain, which are smaller than the others, are preferred.

Aniseeds have an aromatic smell, and a pleasant warm taste, accompanied with a degree of sweetness. Water extracts very little of their flavour; rectified spirit the whole.

PINUS.

Willd. *g.* 1711, Smith, *g.* 408. *Monœcia Adelphia.*—Nat. ord. *Coniferæ.*

RESINA PINI. Ex variis pinis.
1. LIQUIDA, vulgo
 *a)* TEREBINTHINA VENETA.
 *b)* TEREBINTHINA VULGARIS.
2. SOLIDA.
 *a)* SPONTE CONCRETA, vulgo PIX BURGUNDICA.
 *b)* OLEO VOLATILE PRIVATA, vulgo RESINA ALBA.
3. EMPYREUMATICA, vulgo PIX LIQUIDA.
OLEUM VOLATILE PINI.

*Ed.*

*Sp.* 1. Smith, Willd. PINUS SYLVESTRIS. *Ed. Lond. Dub.* Scotch fir.

*Off.*—Common Turpentine. Oil of Turpentine. Rosin. Tar. Black pitch.

*a)* Terebinthina vulgaris, resina liquida. *Lond.*
Terebinthina vulgaris, resina. *Dub.*
*b)* Oleum terebinthinæ; oleum e Terebinthina distillatum. *Lond.*
*c)* Resina flava; residuum postquam Oleum Terebinthinæ distillatum est. *Lond.*
Resina alba. *Dub.*
*d)* Pix liquida. *Dub.*
Pix liquida; resina præparata liquida. *Lond.*
*e)* Resina nigra. *Lond.* resina præparata solida.

*Sp.* 7. Willd. Pinus larix. *Ed. Lond. Dub.*
The Larch.

*Off.*—Venice Turpentine; Oil of Turpentine.
Terebinthina veneta; resina. *Dub.*

*Sp.* 27. Willd. Pinus balsamea. *Ed. Lond. Dub.*
The Hemlock fir.

*Off.*—Balsam of Canada; Canadian Turpentine.
Resina pini balsameæ; resina liquida. *Ed.*
Terebinthina canadensis; resina liquida. *Lond.*
Balsamum canadense. *Dub.*

*Sp.* 32. Willd. Pinus abies. *Ed. Lond. Dub.*
The Spruce fir.

*Off.*—Common Frankincense. Burgundy Pitch.
*a)* Resina abietis; resina concreta. *Lond.*
Pix arida; resina præparata. *Lond.*
Pix burgundica. *Dub.*

These different species of fir are all natives of sandy situations. The first only grows wild in this country. They all abound in every part with resinous juice, which possesses the same general qualities, but presents some varieties, according to the nature of the species and mode of preparation.

We may arrange the products,

1. Into those which exude spontaneously;
2. Into those procured by wounding the tree;
3. Into those procured by decoction; and,
4. Into those which are procured by the action of fire.

*By exudation.*

The pinus larix exudes a species of manna, called Briançon Manna, but it is not used; as, besides the saccharine matter, it evidently contains turpentine.

From the pinus abies, and also from the pinus sylvestris, in warm seasons and climates, a resinous juice exudes spontaneously, which hardens into tears by exposure to the air. It is the common frankincense, or *Thus* of the former editions of the London Pharmacopœia, but no longer officinal. It is a solid brittle resin, brought to us in tears, or masses, of a brownish or yellowish colour on the outside; internally whitish, or variegated with whitish specks, of a bitterish, acrid, not agreeable taste, with little smell.

Real burgundy pitch is collected, according to Tingry, from the Pinus picea, or spruce fir-tree. The resinous juice which exudes from this species is less fluid and less transparent than the proper turpentines. It is collected by the peasants, strained through cloths, and put into barrels. If its consistence be too thick, it is mixed over the fire with a little turpentine and oil of turpentine.

*By incision.*

To obtain the products of the second kind, a series of wounds is made through the bark into the wood, beginning at the bottom, and rising gradually upwards, until a stripe of the bark, about nine feet high, be removed, which is commonly effected in about four years. The same operation is then repeated on the opposite side. The operation is then re-commenced close to the edge of the former wound, which by this time is nearly closed. A tree worked in this manner will survive, and furnish turpentine for near a century. The juice, or turpentine, which flows from these wounds, during summer, is collected in a small cavity formed in the earth, at the bottom of the incisions, from which it is occasionally removed into proper reservoirs previous to its purification.

As the trees exude very little juice during cold weather, no new incisions are made in winter; but the old ones get covered with a soft resinous crust (called *barras*, when it is impure, and mixed with bits of bark, dust, and sand; *gallipot*, when collected with more care; or *white incense*, when it is allowed to remain so long exposed that it becomes resinified,) which is scraped off, and also collected for subsequent purification. All these products are purified by liquefaction and filtration. They consist almost entirely of essential oil and a resin, and differ only in the proportions, the turpentine containing the largest proportion of oil, and the gallipot of resin. Although gallipot contains essential oil, the quantity is so small, that it is never subjected to distillation, but is purified by melting it with a very gentle fire, and filtrating it. By this process it

still contains essential oil, and is often sold by the name of Burgundy pitch. If boiling water be added to it after it is strained, but while it is still fluid, and they be agitated together till the mass cools, we have a yellow resin, which, from still containing some essential oil, is preferred to that prepared by a similar process from the residuum of the distillation of turpentine. A simple mixture of gallipot and barras, made without heat, is often sold under the name of Burgundy pitch; but the mass resulting from this combination soon becomes friable. It has neither the unctuosity, viscidity, tenacity, nor smell which distinguish the real kind.

### *Turpentines.*

Turpentines, or fluid resinous juices obtained by incision, have different appellations, chiefly according to the country from which they are procured.

Balsam of Canada, from the *Pinus balsamea* and *Pinus Canadensis.*
  RESINA PINI BALSAMEÆ. *Ed.*
  TEREBINTHINA CANADENSIS. *Lond.*
  BALSAMUM CANADENSE. *Dub.*
Cyprian turpentine, from the *Pistacia terebinthus.*
  TEREBINTHINA CHIA. *Lond.*
Strasburgh turpentine, from the *Pinus picea.*
Venice turpentine, from the *Pinus larix.*
  TEREBINTHINA VENETA. *Ed. Dub.*
Common turpentine, from the *Pinus sylvestris.*
  TEREBINTHINA VULGARIS. *Lond. Dub. Ed.*
Hungarian balsam, from the *Pinus sylvestris, var. Mughos.*
Carpatian balsam, from the *Pinus cembra.*

None of these are properly balsams; which term is now confined by chemists to those resinous substances which contain benzoic acid. The London college have done well in retaining Turpentine as a proper generic name for these resinous juices.

All these species of turpentine possess the same general properties. They are more or less fluid, with different degrees of transparency: of a whitish or yellowish colour; a penetrating smell, and a warm, pungent, bitterish taste. They are entirely soluble in alcohol, combine with fixed oil, and impart their flavour to water, but are not soluble in it. They are decomposed by a moderate heat, being separated into an essential oil and a resin, and are exceedingly inflammable, burning with a large white flame, and much smoke.

Each species has some peculiarities. The Canadian is reckoned the best, and next to it the Chian. They are more transparent, and have a more agreeable flavour than the other kinds. The common turpentine, as being the most offensive, is rarely given internally; its principal use is in plasters and ointments among farriers, and for the distillation of the essential oil.

*Medical use.*—Taken internally, they are active stimulants, open the bowels, and increase the secretion of urine, to which they give the smell of violets, even though applied only externally. In all cases accompanied with inflammation, they ought to be abstained from, as this symptom is increased, and not unfrequently occasioned by them. They are principally recommended in gleets, fluor albus, and the like. Their dose is from a scruple to a drachm and a half. They are most commodiously taken in the form of a bolus, or blended with watery liquors, by the mediation of the yolk of an egg, or mucilage. They also may be given in the form of electuary, mixed with twice their weight of honey, and in the dose of a drachm of the compound twice or thrice a-day; or of clyster, half an ounce being well triturated with the yolk of an egg, and mixed with half a pound of gruel, or decoction of chamomile.

By distillation turpentines are analysed into two products, a solid resin and a volatile oil.

*Oil of Turpentine* is officinal in the Edinburgh and London Pharmacopœias; by the Dublin college directions are given for its preparation. At Queensferry, in this neighbourhood, there is a considerable turpentine work: the turpentine used comes from America, and therefore it is not a product of any of the officinal species of pine.

Oil of turpentine is lighter than water, transparent, limpid, and volatile. It has a hot pungent taste, and a penetrating smell; is highly inflammable, and possesses all the other properties of essential oils.

It is remarkably difficult of solution in alcohol, although turpentine itself dissolves easily. One part of the volatile oil is indeed apparently taken up by seven of alcohol; but on standing, the greatest part of the oil falls to the bottom, a much larger quantity of alcohol being necessary to retain it in solution.

*Med. use.*—As a medicine, it is highly stimulating and penetrating. Internally it acts as a diuretic or sudorific in very small doses. It has also been given in large doses, mixed with honey, principally in those modifications of chronic

rheumatism which are styled *sciatica*, and *lumbago*. But it has not been often successful, and sometimes has had the effect of inducing bloody urine.

Lately, however, its use in very large doses has been renewed, and with almost invariable success, in one of the most obstinate complaints to which the human body is subject, the tape worm. For this valuable discovery we are indebted to Dr Fenwick of Durham; although its use both in worms and epilepsy seems to have been previously known to Dr Latham, P. L. C. P.; and cases of its efficacy have been published by Drs Bateman and Laird. It has been given even to the extent of four ounces in one dose, without any perceptible bad effects, and scarcely more inconvenience than would follow from an equal quantity of gin. In large doses it is not apt to produce strangury, but only an approach to intoxication, and it generally acts as a speedy purgative, and discharges the worm, in all cases, *dead*.

Dr Perceval, late of Dublin, now of Bath, has also lately given it in epilepsy, and with some success. ℈ ii. ʒ iv. or ℥ i. were mixed by means of syrup, with ℔ j. of mint water; and of this emulsion, one or two table spoonfuls were given every four hours. In this form, and given to the extent of several drachms in the course of the day, it produced no distressing symptoms of the urinary organs, stomach, or bowels. It generally procured immediate and decided relief, but it was not always lasting. Dr Latham suggests, that a large dose should at first be given, and then small doses, so as to keep up the affection of head peculiar to its use.

Externally it often produces excellent effects as a discutient in indolent tumours; as a stimulus in paralysis of the extremities, and in bruises; as an antispasmodic; and as a styptic, when applied on compresses to the bleeding mouths of the vessels, as hot as the patient can bear it.

### *Resins.*

The residuum of the distillation gets different names, according to some peculiarities in its treatment. When the distillation is performed without addition, and continued until the whole essential oil be driven off, and there appear some traces of empyreuma, the residuum is Fiddlers rosin, or Colophony; but if, while the mass is still fluid, a quantity of water be added, and thoroughly blended with the resin by long and constant agitation, it is then called Yellow rosin.

The under part of the cake of the residuum of the distillation resembles fiddlers rosin, the action of the fire having en-

tirely expelled the water and volatile oil, and rendered it slightly empyreumatic and transparent, while the upper part, from retaining some water, is opaque and yellow.

*By decoction.*

A fluid extract, prepared by decoction from the twigs of the pinus sylvestris, is the well-known essence of spruce, which, fermented with molasses and water, forms the fashionable and wholesome beverage of spruce beer.

*By fire.*

The last kind of products from the different species of fir is obtained by the action of fire. With this view, a conical cavity is dug out in the earth, communicating at the bottom with a reservoir. Billets or thin laths of wood are then placed, so as not only to fill the cavity, but to form a conical pile over it, which is covered with turf, and kindled at the top. The admission of air is so regulated, that it burns from above downwards, with a slow and smothered combustion. The wood itself is reduced to charcoal, and the smoke and vapours formed are obliged to descend into the excavation in the ground, where they are condensed, and pass along with the matters liquefied into the receiver. This mixture is denominated Tar, PIX LIQUIDA. *Ed. Lond. Dub.* By long boiling, tar is deprived of its volatile ingredients, and converted into Pitch, RESINA NIGRA. *Lond.*

Tar is a mixture of resin, empyreumatic oil, charcoal, and acetic acid. Its colour is derived from the charcoal; and the other properties in which it differs from a common resin depend on the presence of acetic acid and empyreumatic oil.— The acid itself is not only soluble in water, but also renders the empyreumatic oil more soluble.

*Medical use.*—Tar-water is a heating diuretic and sudorific remedy; but by no means so powerful, or so generally admissible, as it was represented by Bishop Berkeley. Fumigations of tar have been recommended in phthisis by Sir A. Crichton. In some cases they give relief, but never effect a cure. Tar is applied externally in tinea capitis and some other cutaneous diseases.

Dr Bateman has seen good effects in ichthyosis from pitch given internally. It occasioned the rough cuticle to crack and fall off, without the aid of external means, and left a sound skin underneath. This medicine, made into pills with flour, or any farinaceous powder, may be taken to a great extent, ʒiij or ℥ſs daily, not only without injury, but with

advantage to the general health; and affords one of the most effectual means of controlling the languid circulation, and the inert and arid condition of the skin.

Piper.
Willd. *g.* 74. *Diandria Trigynia.*—Nat. ord. *Piperitæ.*

*Sp.* 1. Piper nigrum. *Lond. Ed. Dub.*
Black pepper.

*Off.*—The berry.
Fructus piperis nigri. *Ed.*
Piper nigrum. Baccæ, Semen. *Dub.*
Baccæ piperis nigri. *Lond.*

The black pepper is the fruit of a shrubby creeping plant, which grows wild in the East Indies, and is cultivated, with much advantage to the fruit, in Java and Malabar. The berries are gathered before they are ripe, and are dried in the sun. They become black and corrugated on the surface; their taste is hot and fiery, and their smell slightly aromatic.

Neumann got from 7680 parts 4800 watery, and afterwards 180 alcoholic extract; and inversely, 1080 alcoholic, and 3640 watery The principle on which the pungency depends was soluble both in water and in alcohol, and was not volatile, for 7680 grains furnished about 150 of a very bland volatile oil. From this analysis Dr Thomson's differs remarkably. By macerating pepper in alcohol, and distilling the tincture, he got a green volatile oil, having the whole flavour and pungency of the pepper. Besides this essential principle, he found it to contain an extractive and starch.

White pepper is the fruit of the same plant, gathered after it is fully ripe, and freed of its external coats by maceration in water. It is smooth on the surface, and less pungent than the black pepper.

It is singular, that the Sumatrans, who eat such vast quantities of Cayenne pepper, never mix black pepper with their food. They esteem the latter heating, and ascribe a contrary effect to the former; and Mr Marsden, from experience, agrees with them.

*Sp.* 12. Piper longum. *Lond. Ed. Dub.*
Long pepper.

*Off.*—The fruit.
Fructus piperis longi. *Ed.* Fructus immaturus siccatus. *Lond.*
Piper longum. Fructus. *Dub.*

The plant which bears the long pepper is also a sarmentaceous climber. The berries are small round grains, disposed spirally in a long cylindrical head. They are gathered before they are ripe, and dried, and are the hottest of all the peppers.

The warmth and pungency of these spices are said to reside entirely in a resin; their aromatic odour in an essential oil. In medicine, they are sometimes employed as acrid stimulants; but their chief use is in cookery, as condiments.

Another species of pepper, the *Cubeb*, has a very striking power of checking and curing gonorrhœa, taken in powder to the extent of ʒiij five or six times a-day, and continued for a day or two, after the discharge stops. In a few cases it produces swelled testicle, and in one it produced urticaria. Its only sensible effects are purging, sometimes increase of urine, and imparting to it its peculiar smell. It is also of use in leucorrhœa.

PISTACIA.

Willd. *g.* 1782, *Dioecia Pentandria.*—Nat. ord. *Amentacea.*

*Sp.* 4. PISTACIA TEREBINTHUS. *Lond.*

*Off.*—The liquid resin called Chian turpentine.

TEREBINTHINA CHIA. Resina liquida. *Lond.*

THE shrub which yields this turpentine grows in India, the north of Africa, and south of Europe; but the turpentine is principally collected in the islands of Chios and Cyprus, by wounding the tree. It does not differ from the other turpentines in any thing material except in its price.—See PINUS.

*Sp.* 6. PISTACIA LENTISCUS. *Ed. Lond.*

*Off.*—The resin.

RESINA PISTACIÆ LENTISCI. *Ed.*

MASTICHE. Resina. *Lond.*

THIS species is a native of the same countries with the former. The resin is obtained principally in the island of Chios, by making transverse incisions into the tree, and allowing the juice to harden. It is brought to us in small, yellowish, semitransparent, brittle grains; of a smooth and shining fracture, softening when chewed, fusible, burning with a pleasant smell, insoluble in water, and partially soluble in alcohol and fixed oils. Neumann found, that during digestion with alcohol, a portion separates, insoluble in alcohol, though in appearance resinous, amounting to one-tenth of the mastiche, and analogous to caoutchouc. La Grange and Vogel say it contains free acetic acid.

Its flavour is communicated to water. It is therefore a resin, combined with a little essential oil. It is principally used by the Turkish women as a masticatory, to preserve the teeth, and to give a pleasant smell to the breath.

Plumbum. *Ed. Lond.*
Lead.

The general properties of lead have been already enumerated. It is obtained by various processes from its ores. In its metallic form it is scarcely an officinal article, as its different oxides are purchased from the manufacturers, and never prepared by the apothecary.

*Medical use.*—Its effects on the body are emaciation, violent colics, paralysis, tremors, and contractions of the limbs; and as they generally come on gradually, the cause is sometimes overlooked till it be too late. Poisoning from lead is never intentional, but only accidental, either from liquors becoming impregnated with lead, by being improperly kept in vessels lined or glazed with lead, or by having lead criminally added to them, to correct their acidity; or among manufacturers who work much with lead, as painters and plumbers, and who are not sufficiently attentive to avoid swallowing it.

The presence of lead in any suspected liquor is detected by the hydro-sulphuret of potass, which forms with it a brown precipitate, not soluble in diluted muriatic acid; and still more certainly, by evaporating a portion of the liquor to dryness, and exposing the extract to a heat sufficient to reduce the lead.

Oxidum plumbi semivitreum. *Ed. Lond.*
Lithargyrum. *Dub.*
Semi-vitrified oxide of lead. Litharge.

If oxidized lead be melted with a quick fire, it gets the appearance of oil, and on cooling concretes into litharge. Greatest part of the litharge met with in the shops is produced in the purification of silver from lead, and the refining of gold and silver by means of this metal. According to the degree of fire and other circumstances, it has a pale or deep colour; the first has been commonly called Litharge of silver, the other Litharge of gold. Litharge is a subcarbonate of lead. It contains 96 yellow oxide, and 4 carbonic acid. It also frequently contains a little oxide of antimony.

The oxides of lead dissolve in heat by expressed oils; these mixtures are the bases of several officinal plasters and ointments.

Lead and its oxides, when undissolved, have no considerable effects as medicines. Dissolved in oils, they are supposed to be (when externally applied) anti inflammatory and desiccative. Combined with vegetable acids, they are remarkably so; and taken internally, prove powerful, though dangerous styptics.

PLUMBI SUBCARBONAS, s. s. Subcarbonas plumbi. *Lond.*
CARBONAS PLUMBI, *vulgo* Cerussa. *Ed.*
CERUSSA, s. s. Subacetas plumbi. *Dub.*
White oxide of lead. Ceruse. White lead. Subacetate of lead. Carbonate of lead. Subcarbonate of lead.

THIS substance is prepared by exposing lead to the vapour of vinegar. To accelerate the oxidizement, the lead is cast in thin plates, which are rolled up spirally. A number of these are placed perpendicularly on a support, over a flat vessel containing vinegar, which is converted into vapour by a gentle heat, such as that of dung. The plates become slowly covered with a white crust, which is in due time removed; and the remains of the plates are again exposed to the vapour of vinegar, until they be entirely corroded. Van Mons says, that if lead ashes be dissolved in nitric acid, and precipitated by chalk in impalpable powder, the precipitate, when washed and dried, will be ceruse in its purest state.

White oxide of lead has a scaly or foliated texture, is brittle, friable, heavy, of a snowy whiteness, and a sweet taste. It is often adulterated with earthy substances, which may be discovered by mixing it with oil, and reducing the lead in a crucible. Although very friable, the coarser particles cannot be separated by means of a sieve, because its interstices soon get filled up. It can only be obtained in the state of a fine powder, by rubbing a loaf of ceruse on a sieve placed over a sheet of paper. It consists of 84 yellow oxide of lead, and 14 carbonic acid.

In pharmacy the white oxide of lead is used in the composition of ointments and plasters.

OXIDUM PLUMBI RUBRUM. *Ed.*
Red oxide of lead. Red lead.

THE preparation of red lead is so troublesome and tedious, that the preparation of it forms a distinct branch of business. The manufacturers melt large quantities of lead at once, upon the bottom of a reverberatory furnace built for this purpose, and so contrived, that the flame acts upon a large surface of the metal, which is continually changed by means of iron rakes

drawn backwards and forwards, till the fluidity of the lead is destroyed; after which, the oxide is only now and then turned.

The red oxide of lead is obtained in the form of a very heavy powder, consisting of minute shining scales, of a bright scarlet, verging towards yellow, especially if triturated. It is sometimes adulterated with red oxide of iron, red bole, or powdered brick. These frauds are detected by the inferiority of colour, by mixing it with oil, and subjecting it to the test of reduction; and by its forming a black precipitate with tincture of galls, when dissolved in nitrous acid.

Polygala senega. *Ed. Lond. Dub.*

Willd. *g.* 1313, *sp.* 67. *Diadelphia Octandria.*—Nat. ord. *Lomentaceæ.*

Seneka, or Rattlesnake root.

*Off.*—The root.

Radix polygalæ senegæ. *Ed.*

Radix senegæ. *Lond.*

Radix senekæ. *Dub.*

Seneka is a perennial plant which grows wild in North America, particularly Virginia and Pennsylvania. This root is usually about the thickness of the little finger, variously bent and contorted, and appears as if composed of joints, whence it is supposed to resemble the tail of the animal whose name it bears; a kind of membranous margin runs on each side the whole length of the root.

The bark is the active part of the root. Its taste is at first acrid, afterwards very hot and pungent. It has no smell.

Its acrimony resides in a resin; for it is entirely extracted by alcohol; is precipitated by water; does not rise in distillation; and is not destroyed by keeping.

*Medical use.*—It is an active stimulus, and increases the force of the circulation, especially of the pulmonary vessels. It has therefore been found useful in typhoid inflammations of the lungs; but it is apt to disorder the stomach, and to induce diarrhœa. Dr Brandreth of Liverpool has derived great benefit in some cases of lethargy from an extract of seneka combined with carbonate of ammonia.

Some have likewise employed this root in hydropic cases, and not without success. There are examples of its occasioning a plentiful evacuation by stool, urine, and perspiration; and by this means removing the disease, after the common diuretics and hydragogues had failed.

The Senegaro Indians are said to prevent the fatal effects of the bite of the rattlesnake, by giving it internally, and by applying it externally to the wound.

The usual dose of the powder is 30 grains or more.

Externally, it has been advantageously used as a stimulating gargle in croup.

POLYGONUM BISTORTA. *Ed. Lond. Dub.*

Willd. *g.* 785, *sp.* 3. Smith, *g.* 196, *sp.* 6. *Octandria Trigynia.*—Nat. ord. *Oleraceæ.*

Great bistort, or snakeweed.

*Off.*—The root.

RADIX POLYGONI BISTORTÆ. *Ed.*

RADIX BISTORTÆ. *Lond. Dub.*

BISTORT is perennial, and grows wild in moist meadows in several parts of Britain. It flowers in June. The root is about the thickness of the little finger, of a blackish-brown colour on the outside, and reddish within; it is writhed or bent vermicularly (whence the name of the plant,) with a joint at each bending, and full of bushy fibres; the root of the species here mentioned has, for the most part, only one or two bendings, others have three or more. All the parts of bistort have a rough austere taste, particularly the root, which is one of the strongest of the vegetable astringents.

*Medical use.*—It is employed in hæmorrhagies and other fluxes, both internally and externally, where astringency is the only indication. To the sudorific, antipestilential, and antiseptic virtues attributed to it, it has no other claim than what it derives from its astringency.

POTASSÆ NITRAS, s. s. Nitras potassæ purificata. *Lond.*

NITRAS POTASSÆ. *Ed.*

NITRUM, s. s. Nitras kali. *Dub.*

Nitrate of potass. Purified nitre.

NITRATE of potass is annually produced on the surface of the earth in many countries. For this production, the presence of a calcareous base, heat, and an open, but not too free communication with dry atmospheric air, are requisite. The putrefaction of organic, especially animal, substances, is not necessary to, but accelerates the formation of this salt, by affording the azote in a state in which it combines readily with the oxygen of the atmosphere, and forms the nitric acid. Accordingly, in Germany and France, nitrate of potass is prepared, by exposing mixtures of putrefying animal and ve-

getable substances, and calcareous earths, to the action of the atmosphere. The salt is afterwards extracted by lixiviation and crystallization. The nitre used in this country is chiefly imported from the East Indies. As it occurs in commerce, it often contains a little muriate of potass and muriate of soda, from which it is easily purified by dissolving it in boiling water, and filtering it; on cooling, the nitrate of potass crystallizes, and the other salts remain dissolved.

Nitrate of potass has a sharp, bitterish, cooling taste. It shoots in pretty large crystals, which are generally six-sided prisms, terminated by six-sided pyramids; very brittle; permanent in the atmosphere; soluble in seven times their weight of water at 60°, and in an equal weight at 212°; melting when exposed to a strong heat, giving out at first oxygen, and afterwards nitrogen gas, until the whole acid be decomposed, and the potass alone remain behind. It deflagrates more or less violently with all oxygenizable substances, oxidizing or acidifying them. When dried in a temperature of 70°, it consists, according to Kirwan, of 44 nitric acid, 51.8 potass, and 4.2 water. It is decomposed by the sulphuric acid and baryta, by the muriate and acetate of baryta, and the sulphates of soda, ammonia, magnesia, and alumina.

*Medical use.*—Taken to the extent of from a drachm to half an ounce in the course of a day, in repeated doses, it diminishes the heat of the body, and the frequency of the pulse, operates by stool, and acts upon the secretion of urine, but is apt to produce pains in the stomach. In large doses, such as an ounce, taken at one time, it produces the most dreadful symptoms, constant bloody vomiting, purging, convulsions, and death. Accidents of this kind have happened, from its being sold, by mistake, for sulphate of soda.

It is best given in small doses, as from five to ten grains, frequently repeated, and is only admissible in inflammatory diseases. Externally it is used in gargles for inflammatory sore throats.

POTASSÆ SUPERTARTRAS, s. s. Supertartras potassæ purificata. *Lond.*

SUPER-TARTRAS POTASSÆ. *Ed.* v. s. Tartarus purificatus; Crystalli tartari. *Ed.*

CRYSTALLI TARTARI. *Dub.*

Super-tartrate of potass. Crystals of tartar, and cream of tartar.

SUPER-TARTRAS POTASSÆ IMPURUS, v. s. Tartarus crudus. *Ed.*

TARTARUM, s. s. Potassæ super-tartras impurus. *Lond.*
TARTARUM. *Dub.*
Impure super-tartrate of potass. Tartar.

TARTAR exists in verjuice and in must, and is gradually deposited on the sides of the casks in which the wine is made, from which it is scraped before the next vintage, to prepare the casks to receive the new wine. The deepest coloured and roughest wines generally give most tartar; and it gets the name of white or red tartar, according to its colour.

It is purified by dissolving it in boiling water, and filtrating the boiling solution, which, on cooling, deposits irregular crystals, containing the oily and colouring matters. These are separated by boiling the crystals with a white clay. At Venice, they are purified by dissolving them in water, and clarifying them with whites of eggs and ashes. The tartar, thus purified, when crystallized, or in powder, is called Cream of Tartar.

Its crystals are small and irregular, and do not melt in the mouth, but feel gritty under the teeth. It has an acid harsh taste. It is soluble in sixty times its weight of water at 60°, and in thirty at 212°. It is decomposed, and its acid is destroyed by heat. It contains 23 parts of potass, according to Bergman, and 33 according to Thenard.

*Medical use.*—The virtues of tartar are those of a mild, cooling, aperient, laxative medicine. It is much used in dropsy; and some allege, that it has good effects as a deobstruent in dropsy from scirrhus. Taken from half an ounce to an ounce, it proves a gentle, though effectual purgative. Given in smaller doses, and in solution, it often acts as a powerful diuretic.

PRUNUS DOMESTICA. *Ed. Lond. Dub.*
Willd. *g.* 982, *sp.* 29. *Icosandria Monogynia.*—Nat. ord. *Pomaceæ.*

Plum-tree.

*Off.*—The dried fruit, called French prunes.
FRUCTUS PRUNI DOMESTICÆ. *Ed.*
PRUNA; Drupa siccata Pruni Domesticæ. *Dub.*
FRUCTUS PRUNI GALLICÆ. *Lond.*

THIS tree is found wild in hedges in England, but has probably originated from the stones of the cultivated kinds being dropt there by accident. It flowers in April. Great quantities of the dried fruit are imported from the continent, of which the French prunes are reckoned the best.

*Medical use.*—They contain much mucilaginous and saccharine matter, and their medical effects are, to abate heat and gently loosen the belly, which they perform by lubricating the passages, and softening the excrement. They are of considerable service in costiveness, accompanied with heat or irritation, which the more stimulating cathartics would tend to aggravate: where prunes are not of themselves sufficient, their action may be promoted by joining with them a little rhubarb, or the like, to which may be added some carminative ingredient, to prevent their occasioning flatulency.

PTEROCARPUS.

Willd. *g.* 1318. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ.*

*Sp.* 6. PTEROCARPUS SANTALINUS. *Ed. Lond. Dub.*

*Off.*—Red Saunders-wood.

LIGNUM PTEROCARPI SANTALINI. *Ed.*

LIGNUM PTEROCARPI. *Lond.*

LIGNUM SANTALI RUBRI. *Dub.*

THIS tree grows in the East Indies, and acquires a very large size. The wood is brought in large billets, of a compact texture, a dull red, almost blackish colour on the outside, and a deep brighter red within. It has no manifest smell, and little or no taste. It communicates a deep red to alcohol, but gives no tinge to aqueous liquors: a small quantity of the resin, extracted by means of spirit, tinges a large quantity of fresh spirit, of an elegant blood red. Neumann got from 960 grains, 210 alcoholic, and afterwards 20 of watery extract; and inversely, 126 tough watery extract, and 120 alcoholic; according to the same chemist, it gives out its colouring matter to volatile oil of lavender, but not to volatile oil of turpentine. Is this difference to be ascribed to the camphor contained in the former?

*Sp.* 1. PTEROCARPUS DRACO. *Ed.*

*Off.*—The resin called Dragon's blood.

RESINA PTEROCARPI DRACONIS.

THIS is also a very large tree. It is a native of South America, and the resin which exudes from incisions made in its bark used to be frequently sent from Carthagena to Spain. It is, however, doubtful if the dragon's blood of the shops be produced from this tree, as many others furnish a red juice concreting into a similar resin. For example, the Dracœna draco, Dalbergia monetaria, and especially the Calamus dra-

co, which probably furnishes all that is brought from the East Indies.

The best dragon's blood is not in cakes, but is brought in small masses, of the size of a nutmeg, wrapt up in the dried leaves of some kind of reed, breaks smooth, free from any visible impurities, of a dark red colour, which changes, upon being powdered, into an elegant bright crimson. This drug, in substance, has no sensible smell or taste; when dissolved, it discovers some degree of warmth and pungency. It is fusible and inflammable, and totally soluble in alcohol, tinging a large quantity of the menstruum of a deep red colour. It is likewise soluble in expressed oils, and gives them a red hue, less beautiful than that communicated by Anchusa. It is not acted upon by water, but precipitated by it from its alcoholic solution. I find that it is soluble in nitrous acid and alkalies, and that it neither precipitates gelatine, nor affects the colour of the salts of iron. It therefore appears to be a pure resin, without any astringency. I have been more particular in proving that this resin is not astringent, because Mr Proust's account of it has been generally adopted. But the substance examined by Mr Proust could not be the resin known in this country by the name of Dragon's blood, as it was as soluble in water as in alcohol. Dr Fothergill, who first described kino, received it as the finest dragon's blood. Mr Proust must have been misled by some similar misinformation, as the characters of his *sang dracon* correspond with those of kino.

PUNICA GRANATUM. *Ed. Lond. Dub.*

Willd. *g.* 980, *sp.* 1. *Icosandria Monogynia.*—Nat. ord. *Pomaceæ.*

Pomegranate tree.

*Off.*—Pomegranate bark. The double flowers, called Balaustine.

*a)* CORTEX GRANATI. Pomorum cortex. *Lond.*
CORTEX PERICARPII PUNICÆ GRANATI. *Dub.*

*b)* FLORES GRANATI. *Dub.*

THE pomegranate is a low tree, or rather shrub, growing wild in Italy and other countries in the south of Europe. It is sometimes met with in our gardens; but the fruit, for which it is chiefly valued, rarely comes to perfection. This fruit has the general qualities of the other sweet summer fruits, allaying heat, quenching thirst, and gently loosening the belly. The rind is a strong astringent, striking a permanent blue with sulphate of iron, and as such is occasionally made use of. It has been lately given by Dr Buchanan with

success in the East Indies for the cure of taenia. I also made some trials of it and of catechu in this country, on the supposition that it was the astringent principle which acted chemically on the gelatinous body of the worm, and the result was promising; but the introduction of the oil of turpentine prevented me from prosecuting the experiment. The flowers are of an elegant red colour, in appearance resembling a dried red rose. Their taste is bitterish and astringent. They are recommended in diarrhœas, dysenteries, and other cases where astringent medicines are proper.

PYRUS CYDONIA. *Lond.*
Willd. *g.* 992, *sp.* 17. *Icosandria Pentagynia.*—Nat. ord. *Pomaceæ.*

*Off.*—Quince seeds.
SEMINA CYDONIÆ. *Lond.*

THE quince is originally a native of Crete, but ripens its fruit perfectly in England.

Quinces have a very austere acid taste; taken in small quantity, they are supposed to restrain vomiting and alvine fluxes; and more liberally, to loosen the belly. The seeds abound with a mucilaginous substance, of no particular taste, which they readily impart to watery liquors; an ounce will render three pints of water thick and ropy, like the white of an egg. They will not, however, supply the place of gum arabic, because their mucilage spoils very quickly, and is precipitated by acids.

QUASSIA.
Willd. *g.* 849, *Decandria Monogynia.*—Nat. ord. *Gruinales.*

*Sp.* 2. QUASSIA SIMARUBA. *Ed. Lond. Dub.*
Mountain or bitter damson.

*Officinal.*—The bark and wood.
*a)* CORTEX QUASSIÆ SIMARUBÆ. *Ed.*
CORTEX SIMAROUBÆ. *Lond. Dub.*
*b)* LIGNUM SIMAROUBÆ. *Dub.*

THIS tree grows in Guiana and in Jamaica. The simarouba of the shops is the bark of the root. It is brought to us in pieces some feet long, and some inches broad, folded lengthwise. It is light, fibrous, very tough; of a pale yellow on the inside; darker coloured, rough, scaly, and warted on the outside; has little smell, and a bitter, not disagreeable taste. It gives out its bitterness both to alcohol and water.

*Medical use.*—It has been much celebrated in obstinate

diarrhœa, dysentery, anorexia, indigestion, lienteria, and intermittent fevers.

It is given in powder, in doses of half a drachm, or a whole drachm; but it is too bulky, and very difficultly pulverizable. It is best exhibited in decoction. Two drachms of the bark may be boiled in two pounds of water to one, and the decoction drunk in cupfuls in the course of the day.

*Sp.* 3. QUASSIA EXCELSA. *Ed. Lond. Dub.*
Quassia tree.
*Officinal.*—The wood.
LIGNUM QUASSIÆ EXCELSÆ. *Ed.*
LIGNUM QUASSIÆ. *Lond. Dub.*

THE quassia of the shops is the wood of the root of this tree, which grows in Jamaica, and in the Caribæan islands, and not, as formerly supposed, of the quassia amara, which is a very rare tree, surpassing all others in bitterness.

This root is about the thickness of a man's arm; its wood is whitish, becoming yellowish by exposure to the air. It has thin, grey, fissured, brittle bark, which is deemed, in Surinam, more powerful than the wood. Quassia has no sensible odour, but is one of the most intense, and durable, pure bitters known. Its infusion, decoction, and tincture, are almost equally bitter, are yellowish, and are not blackened by chalybeates. The properties of the extract of quassia have been detailed by Dr Thomson, under the title of the bitter principle.

*Medical use.*—It is a very pure and simple bitter, and may be given in all cases where bitters are proper. It has been exhibited in intermittent and bilious fevers, in stomachic complaints, in lienteria, in cachexy, dropsies, leucorrhœa, and gout. It is much used in this country to give the bitterness to malt liquors, though it subjects those brewers who employ it to a very heavy penalty.

It can scarcely be reduced to a sufficient fine powder to be given in substance, and is, therefore, generally given in the form of infusion, decoction, or extract.

QUERCUS.
Willd. *g.* 1692. Smith, *g.* 404. *Monoecia Polyandria.*—Nat. ord. *Amentaceæ.*

*Sp.* 65. Willd. QUERCUS PEDUNCULATA. *Lond.*
*Sp.* 1. Smith. QUERCUS ROBUR. *Dub. Ed.*
Common British oak.
*Officinal.*—Oak bark.

CORTEX QUERCUS ROBORIS. *Ed.*
CORTEX QUERCUS. *Lond. Dub.*

THE oak grows wild in Britain, and flowers in April. The superior excellence of its wood for ship-building has rendered its cultivation an object of national concern. Its saw-dust is an useful dye stuff, and its bark is the principal article used in tanning. M. Vauquelin has discovered a remarkable chemical difference between the bark and nut-galls, the latter precipitating tartrate of antimony and infusion of cinchona, which are not acted on by the former.

*Med. use.*— Oak bark is a strong astringent, and is recommended in hæmorrhagies, alvine fluxes, and other preternatural or immoderate secretions. In these it is sometimes attended with good effects. But it is by no means capable of being employed as a substitute, in every instance, for Peruvian bark, as some have asserted; and, indeed, it is so difficultly reduced to a sufficiently fine powder, that it can scarcely be given internally, in substance.

RHAMNUS CATHARTICUS. *Ed. Dub. Lond.*
Willd. *g.* 405, *sp.* 1. Smith, *g.* 105, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Dumosæ.*
Purging buckthorn.
*Off.*—The berry. The juice of the berries.
SUCCUS RHAMNI CATHARTICI. *Ed.*
BACCÆ RHAMNI. *Lond.*
BACCÆ RHAMNI CATHARTICI. *Dub.*

THIS tree, or bush, is common in hedges; it flowers in May and June, and ripens its fruit in September or the beginning of October. In our markets, the fruit of some other trees, as the blackberry bearing alder and the dogberry tree, have been frequently mixed with, or substituted for those of buckthorn. This abuse may be discovered by opening the berries; those of buckthorn have almost always four seeds, of the alder two, and of the dogberry only one. Buckthorn berries, bruised on white paper, stain it of a green colour, which the others do not. Those who sell the juice to the apothecaries, are said to mix it with a large proportion of water.

*Medical use.*—Buckthorn berries have a faint disagreeable smell, and a nauseous bitter taste. They have long been in considerable esteem as cathartics, and celebrated in dropsies, rheumatisms, and even in the gout; though in these cases they have no advantage over other purgatives, but are more offensive, and operate more severely, than many which the shops

are furnished with. They generally occasion gripes, sickness, dry the mouth and throat, and leave a thirst of long duration. The dose is about twenty of the fresh berries in substance, and twice or thrice this number in decoction; an ounce of the expressed juice, or a drachm of the dried berries.

RHEUM.

Willd. *g.* 803. *Enneandria Monogynia.*—Nat. ord. *Oleraceæ.*

*Sp.* 3. RHEUM PALMATUM. *Lond. Dub.*

Palmated rhubarb.

*Officinal.*—The root.

RADIX RHEI. *Lond. Dub.*

*Sp.* 2. RHEUM UNDULATUM. *Dub.*

*Officinal.*—The root.

RADIX RHEI UNDULATI. *Dub.*

RADIX RHŒI. *Ed.*

*a)* RHEUM RUSSICUM *vel* TURCICUM. *Ed.*

*b)* RHEUM SINENSE *vel* INDICUM. *Ed.*

*c)* RHEUM BRITANNICUM. *Ed.*

Turkey, China, and British rhubarb, got from the palmated rhubarb and other species.

BOTH of these species grow spontaneously in China, and endure the cold of our climate.

But it is not ascertained that the Chinese or Russian rhubarb is the dried root of either the one or the other. Pallas thinks that it is obtained indiscriminately from the *rheum undulatum*, *palmatum*, and *compactum*, more especially from the first; while Mr Sievers, an apothecary who was sent by Catherine II. on purpose to obtain the true rhubarb plant, and travelled for several years in the countries contiguous to that whence the rhubarb is brought, is of opinion, that the botanical characters of the plant, which furnishes it, are still unknown, excepting that it is said not to grow to a great size, and to have round leaves, which are toothed on the edges with almost spinous points.

All the rhubarb of commerce is brought from the Chinese town Sini, or Selim, by the Bucharians. It grows on the neighbouring chain of lofty mountains which stretches to the lake Koko-Nor, near the source of the river Chorico, between 35° and 40° north latitude. It is dug up by the peasants, cleaned from the earth, cut in pieces, strung with the bark on strings, and exposed to dry under cover in the shade for a whole year, when it is again cleaned and prepared for exportation.

There is a distinction made in commerce between the Russian and Chinese rhubarb, although they both come from the same country.

The Russian is dearer, and always good, as very great attention is paid both in purchasing and transporting it, by order of the government. In Kiachta, on the Russian frontier, it is received from the Bucharians by the Russian apothecary, who examines it. The bad is immediately burnt, and the good is freed from its bark, woody parts, and every impurity, in the most careful manner. It is then sent to Moscow and to Petersburgh, where it is again examined.

It is commonly in round pieces, of a reddish or whitish-yellow colour, feels gritty between the teeth, and is often perforated with so large a hole, that many pieces have the appearance of a mere rind.

The Chinese or East Indian rhubarb is brought by sea from Canton. It is heavier, harder, and more compact than the other; seldom perforated with holes, and either, in long pieces, or with two flat sides, as if they had been compressed. Dr Lewis thinks that this is less aromatic, but stronger, than the Turkey; and that it has required less care in drying, from having been lifted when the root was less watery.

The general characters of good rhubarb are, its having a whitish or clear yellow colour, being dry, solid, and compact, moderately heavy, brittle; when recently broken, appearing marked with yellow or reddish veins, mixed with white; being easily pulverizable; forming a powder of a fine bright yellow, having the peculiar, nauseous, aromatic smell of rhubarb, and a sub-acrid, bitterish, somewhat astringent taste, and when chewed feeling gritty under the teeth, speedily colouring the saliva, and not appearing very mucilaginous. The size and form of the pieces are of little consequence; only we must break the large ones, to see that they are not decayed or rotten within; and we must also observe that they are not musty or worm-eaten. This is the more necessary, as damaged pieces are frequently so artfully dressed up, and coloured with powdered rhubarb, as to impose on the buyer.

The principal constituent of rhubarb is extractive matter, soluble both in alcohol and in water. By gentle decoction it loses about one-half its weight. Rhubarb also contains some volatile odorous matter, on which its peculiar nauseous smell, and its activity as a purge, depend; for when dissipated, either by age or any preparation to which the rhubarb has been subjected, the powers of the medicine are almost destroyed. It also contains about one-sixth of its weight of oxalate of lime, and some tannin, which resides entirely in the dark-co-

loured veins, for on wetting the surface with a weak chalybeate solution, these alone are blackened, while the white veins do not change their colour. Neumann got from 480 grains 180 of alcoholic, and afterwards 170 watery extract: and inversely, 350 watery, and only 5 of alcoholic extract.

Various species of rhubarb, especially the palmatum, are cultivated in this country, and sometimes in very large quantities; so that there can be no doubt that the roots, the growth of this country, may be so prepared as to have the appearance, at least, of foreign rhubarb. The greatest difficulty seems to be the drying it properly. Its cultivation is easy. It is sown in spring, in a light soil, and transplanted next spring into a light soil, well trenched, and the plants set at a yard distance from each other each way. The third year some plants begin to flower, but the roots are not lifted till the autumn of the sixth year. They are first to be washed in a large quantity of water, and after the fibres and small roots are cut off, to be well brushed in fresh water, and cut into pieces of a proper size. The brown bark is then rasped off, and they are again thrown into fresh water for three or four hours, in which they give out a great quantity of gummy matter. They are then taken out, and laid upon twigs to drip till next morning, and it is chiefly in this time that they exude at every part a white transparent gummy matter, resembling jelly. They are lastly placed in a stove, heated to 120° or 140°, till they dry. Twenty-five pounds of the recent root gave only about eight pounds dry. It is not, however, yet fit for sale. All the wrinkles must be rasped and filed out, and the pieces thus dressed put in a barrel fixed on an axis, and rolled about in it for twenty minutes or half an hour, when they get covered by a fine powder, formed by their rubbing against each other. Prepared in this way, Beaumé assures us that it not only has the appearance of foreign rhubarb, but like it could also be immediately powdered. The chief peculiarity in his process is the steeping the roots, after they are cleaned, in water, by which means they are deprived of a great quantity of gummy matter; and without this precaution, even when apparently perfectly dry, the roots cannot be reduced into powder, but become pasty under the pestle, until it be two years old, and even then the powder is apt to concrete into lumps, and to get a dark-brown colour. Four ounces of French rhubarb yielded to Beaumé 1644 grains of extract, and the same quantity of foreign rhubarb 1500. British rhubarb, as it is called, is cultivated in considerable quantities in the neighbourhood of Edinburgh, and sold at nearly the price of foreign rhubarb. It is easily reduced to a very fine

powder, although it is merely washed and peeled before it be cut into proper pieces, and dried upon the top of a baker's oven. The leaf-stalks of rhubarb contain a pleasant acid juice, and are used for making tarts, which are very like those of quinces; and Olivier tells us that the Persians have long been in the habit of using the Rheum ribes in the same manner, preserved or raw.

*Medical use.*—Rhubarb is a mild cathartic, which operates without violence or irritation, and may be given with safety even to pregnant women and to children. In some people, however, it occasions severe griping. Besides its purgative quality, it is celebrated as an astringent, by which it increases the tone of the stomach and intestines, and proves useful in diarrhœa and disorders proceeding from laxity.

Rhubarb is exhibited,

1. In substance, in the form of powder. It operates more powerfully as a purgative in this form than in any other. The dose for an adult is about a scruple or upwards. On account of its great bulk, it is sometimes unpleasant to take a sufficient dose; its laxative effects are therefore often increased by the addition of neutral salts, or other more active purgatives. In smaller doses it often proves an excellent stomachic.

2. In infusion. Rhubarb yields more of its purgative property to water than to alcohol. The infusion is, however, considerably weaker than the powder, and requires double the dose to produce the same effect. It is well adapted for children, but must be always fresh prepared.

3. In tincture. On account of the stimulating nature o the menstruum, this preparation frequently cannot be exhibited in doses large enough to operate as a purgative. Its principal use is as a tonic and stomachic.

The virtues of rhubarb are destroyed by roasting, boiling, and in forming the extract.

Rhododendron chrysanthum. *Ed.*

Willd. *g.* 867, *sp.* 7. *Decandria Monogynia.*—Nat. ord. *Bicornes.*

Yellow-flowered rhododendron.

*Off.*—The leaves.

Folia rhododendri chrysanthi. *Ed.*

This small shrub grows in the coldest situations, and highest parts of the snow-covered mountains in east Siberia, and especially in Dauria. The leaves are oblong, rigid, reflected at the edges, rough on the upper surface, smooth, and paler on the lower. When dried, they have no smell, but a rough,

astringent, and bitterish taste. They also contain a stimulant narcotic principle; for they increase the heat of the body, excite thirst, and produce diaphoresis, or an increased discharge of the other secretions or excretions, and, in a large dose, inebriation and delirium.

*Medical use.*—In decoction, it is used in Siberia in rheumatism and gout. About two drachms of the dried shrub are infused in an earthen pot, with about ten ounces of boiling water, keeping it near a boiling heat for a night, and the infusion taken in the morning. Besides its other effects, it is said to produce a sensation of prickling or creeping in the pained parts; but in a few hours the pain and disagreeable symptoms are relieved, and two or three doses generally complete the cure. Liquids are not allowed during its operation, as they are apt to induce vomiting.

RHUS TOXICODENDRON. *Ed. Lond.*

Willd. *g.* 566, *sp.* 17. *Pentandria Trigynia.*—Nat. ord. *Dumosæ.*

Poison oak.

*Off.*—The leaves.

FOLIA RHOIS TOXICODENDRI. *Ed.*

FOLIA TOXICODENDRI. *Lond.*

THIS is a deciduous shrub of moderate growth, a native of North America. The leaves are alternate, and stand upon very long leaf-stalks. Each leaf consists of three leafits. It is said that its juice is so extremely acrid as to cause inflammation, and sometimes even sphacelation, in the parts touched with it.

*Medical use.*—It was first tried as a medicine by Dr Alderson of Hull, in imitation of the experiments of M. Fresnoi with the Rhus radicans. He gave it in four cases of paralysis, in doses of half a grain, or a grain three times a-day, and all his patients recovered, to a certain degree, the use of their limbs. The first symptom of amendment was always an unpleasant feeling of prickling or twitching in the paralytic limbs. We have given it in larger doses, without experiencing the same success. It was not, however, inactive. In one case the patient discontinued its use on account of the disagreeable prickling it occasioned; and in general it operated as a gentle laxative, notwithstanding the torpid state of the bowels of such patients.

RICINUS COMMUNIS. *Ed. Lond. Dub.*

Willd. *g.* 1720, *sp.* 2. *Monoecia Monadelphia.*—Nat. ord. *Tricoccæ.*

Palma Christi.

*Off.*—The seeds, and the fixed oil obtained from them. Castor oil.

*a)* Semina ricini communis. *Ed.*
Semina ricini. *Lond.*

*b)* Oleum fixum ricini communis. *Ed.*
Oleum ricini, e seminibus expressum. *Lond. Dub.*

This beautiful plant grows in both Indies, Africa, and the south of Europe. It is of speedy growth, and in one year arrives at its full height, which seldom exceeds twenty feet.—The capsules are prickly and triangular, and contain, under a thin, dry, grey, and black-marbled husk, a white oily kernel. The skin is extremely acrid; and one or two of the seeds swallowed entire operate as a drastic purgative or emetic.

The kernels yield almost a fourth part of their weight of a bland fixed oil, commonly called Castor oil. It is obtained from them either by expression, or by decoction with water. The former method is practised in Europe, the latter in Jamaica. To increase the product, it is common to parch the seeds over the fire, before the oil is extracted from them; but the oil thus obtained is inferior to that prepared by cold expression or simple decoction, and is apt to become rancid.

Genuine castor oil is thick and viscid, of a whitish colour, insipid or sweetish to the taste, and without smell.

*Medical use.*—As a medicine, it is a gentle and useful purgative: it in general produces its effects without griping, and may be given with safety where acrid purgatives are improper, as in cholic, calculus, gonorrhœa, &c.: some likewise use it as a purgative in worm cases. Half an ounce, or an ounce, commonly answers with an adult, and a drachm or two with an infant.

The aversion to swallowing oil is generally considerable. Different modes of overcoming this have been proposed.—Some prefer taking it swimming on a glass of water, or peppermint water, others mixed with coffee, in the form of an emulsion, with mucilage, or with the addition of a little rum.

Rosa.

Willd. *g.* 997. Smith, *g.* 232. *Icosandria Polygynia.*—Nat. ord. *Senticosæ.*

*Sp.* 16. Willd. Rosa gallica. *Ed. Lond. Dub.*
Red rose.

*Off.*—The petals.

Petala rosæ gallicæ. *Ed. Lond.*
Petala rosæ rubræ. *Dub.*

This has not the fragrance of the succeeding species; but the beautiful colour of its petals, and their pleasant astringency, have rendered them officinal. It must, however, be remarked, that their odour is increased by drying, while that of the damask rose is almost destroyed.

*Sp.* 15. Willd. ROSA CENTIFOLIA. *Ed. Lond. Dub.*
Damask rose.

*Off.*—The petals.
PETALA ROSÆ CENTIFOLIÆ. *Ed. Lond.*
PETALA ROSÆ DAMASCENÆ. *Dub.*

The native country of this shrub is unknown, but the delightful fragrance of its flowers has rendered it the favourite ornament of every garden. In the former editions of Linnæus, the damask rose was considered as a variety only of the Rosa centifolia; but Aiton, Du Roy and Willdenow have arranged it as a distinct species. This used to be the officinal rose for the distillation of rose water, but now the more common variety is ordered, as it is highly probable that the petals of all the varieties of the Rosa centifolia, or Dutch hundred-leaved rose, are employed indiscriminately for this purpose.

*Sp.* 31. Willd.; *sp.* 6. Smith. ROSA CANINA. *Ed. Lond.*
Common dog-rose, wild briar or hep-tree.

*Off.*—The fruit called Heps.
FRUCTUS ROSÆ CANINÆ. *Ed.*
PULPA ROSÆ CANINÆ; baccarum pulpa expressa. *Lond.*

This shrub is found in hedges throughout Britain, and flowers in June. The pulp of the fruit, besides saccharine matter, contains citric acid, which gives it an acrid taste. The seeds, and stiff hair with which they are surrounded, must be carefully removed from the pulp before it can be used.

ROSMARINUS OFFICINALIS. *Ed. Lond. Dub.*
Willd. *g.* 62, *sp.* 1. *Diandria Monogynia.*—Nat. ord. *Verticillatæ.*
Rosemary.

*Off.*—The herb and flowers.
CACUMINA RORISMARINI OFFICINALIS. *Ed.*
CACUMINA RORISMARINI. *Lond.*
HERBA RORISMARINI. *Dub.*

Rosemary is a perennial shrub, which grows wild in the south of Europe, and is cultivated in our gardens. It has a

fragrant smell, and a warm pungent bitterish taste, approaching to lavender: the leaves and tender tops are strongest; next to these the cup of the flower: the flowers themselves are considerably the weakest, but most pleasant.

*Medical use.*—Its virtues depend entirely on its essential oil, which seems to be combined with camphor, not only from its peculiar taste, but from its possessing chemical properties, which depend on the presence of camphor; and from its depositing crystals of camphor when long kept.

RUBIA TINCTORUM. *Ed. Lond. Dub.*

Willd. *g.* 187, *sp.* 1. *Tetandria Monogynia.*—Nat. ord. *Stellatæ.*

Madder.

*Off.*—The root.

RADIX RUBIÆ TINCTORUM. *Ed.*

RADIX RUBIÆ. *Lond. Dub.*

MADDER is perennial, and is cultivated in large quantities in England, from whence the dyers are principally supplied with it. It has been said to grow wild in the south of England, but the Rubia peregrina was mistaken for it.

The roots consist of articulated fibres, about the thickness of a quill, which are red throughout, have a weak smell, and a bitterish astringent taste. For the use of the dyers, they are first peeled and dried, then bruised and packed in barrels. Madder possesses the remarkable property of tinging the urine, milk, and bones of animals which are fed with it, of a red colour.

*Medical use.*—It is said to be useful in the atrophy of children, and some believe in its reputed powers as an emmenagogue.

It is given in substance in doses of half a drachm, several times a-day, or in decoction.

RUMEX.

Willd. *g.* 699.; Smith, *g.* 184. *Hexandria Trigynia.*—Nat. ord. *Oleraceæ.*

*Sp.* 18. Willd.; *sp.* 8. Smith. RUMEX AQUATICUS. *Dub.*
Great water-dock.

*Off.*—The root.

RADIX RUMICIS AQUATICI. *Dub.*

THIS is a perennial weed, growing in ditches and by the sides of rivers. It grows to the height of five feet, and flowers in July and August. The root is large, and is manifestly

astringent. It evidently is the *Herba Britannica* of the ancients, so much celebrated for the cure of scurvy and cutaneous diseases. Even syphilis has been said to yield to an infusion of water-dock in wine and vinegar.

*Sp.* 31. Willd.; *sp.* 10. Smith. RUMEX ACETOSA. *Ed. Lond.*
Common sorrel.

*Off.*—The leaves.
FOLIA RUMICIS ACETOSÆ. *Ed.*
FOLIA ACETOSÆ. *Lond.*

SORREL is a perennial plant which grows wild in fields and meadows throughout Britain, and flowers in June. The leaves have a pleasant acid taste, without any smell or particular flavour; their medical effects are, to cool, quench thirst, and promote the urinary discharge: a decoction of them in whey affords an useful and agreeable drink in febrile or inflammatory disorders. All these effects are to be ascribed entirely to the super-oxalate of potass which they contain.

RUTA GRAVEOLENS. *Ed. Lond. Dub.*
Willd. *g.* 927, *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Multisiliquæ.*
Rue.

*Off.*—The herb.
HERBA RUTÆ GRAVEOLENTIS. *Ed.*
FOLIA RUTÆ. *Lond. Dub.*

THIS is a small shrubby plant, a native of the south of Europe, and cultivated in our gardens.

Rue has a strong ungrateful smell, and a bitterish penetrating taste: the leaves, when in full vigour, are extremely acrid, insomuch as to inflame and blister the skin, if much handled. Neumann got from 960 grains of the dried leaves 330 alcoholic extract, and afterwards 290 watery; and inversely, 540 watery and 40 alcoholic. Both primary extracts are bitter and acrid. Rue also contains a volatile oil, which congeals readily, and is obtained in the greatest quantity by distilling the plant with the seeds half-ripe.

*Medical use.*—With regard to its medical virtues, like other remedies of which the active constituent is an essential oil, it is heating and stimulating, and hence it is sometimes serviceable in spasmodic affections, and cases of obstructed secretions.

SACCHARUM OFFICINARUM. *Ed. Lond. Dub.*
Willd. *g.* 122, *sp.* 4. *Triandria Digynia.*—Nat. ord. *Gramina.*
Sugar-cane.

*Off.—a)* Raw or brown sugar.
SACCHARUM. Præparatum e succo expresso. *Lond.*
SACCHARUM NON PURIFICATUM. *Ed.*
SACCHARUM RUBRUM. *Dub.*

*b)* Double refined sugar.
SACCHARUM PURIFICATUM. *Lond. Dub.*
SACCHARUM PURISSIMUM. *Ed.*

*c)* Molasses.
SACCHARI RUBRI SYRUPUS. (Molasses.) *Dub.*
SYRUPUS EMPYREUMATICUS. *Ed.*

THE sugar-cane grows wild in both Indies, and forms the chief object of cultivation in the West Indies.

Sugar, of which we have already noticed the general properties, is principally obtained from this plant, by boiling down its expressed juice, with the addition of a certain proportion of lime or potass, until the greater part is disposed to concrete into brownish or yellowish crystalline grains. The lime or potass is added to saturate some malic acid, whose presence impedes the crystallization. The *molasses* is that portion of the inspissated juice which does not crystallize. 1. The crystallized portion, or *raw sugar*, is sent to Europe to be refined. This is performed by dissolving it in water, boiling the solution with lime water, clarifying it with blood, or white of eggs, and straining it through woollen bags. The solution, after due evaporation, is permitted to cool to a certain degree, and then poured into conical forms of unglazed earthen ware, where it concretes into a mass of irregular crystals. The syrup which has not crystallized runs off through a hole in the apex of the cone. The upper or broad end of the cone is then covered with moist clay, the water of which gradually penetrates into the sugar, and displaces a quantity of syrup, which would otherwise be retained in it, and discolour it. It is then carefully dried, and gets the name of *loaf* or *lump sugar*. When the solution and other steps of the process are repeated, the sugar is said to be *double refined*. Sugar is sometimes made to assume a more regular form of crystallization, by carrying the evaporation only a certain length, and then permitting the syrup to cool slowly. In this form it is called *Brown* or *White sugar-candy*, according to the degree of its purity.

*Raw sugar* varies very much in quality. It should be dry, crystallized in large sparkling hard grains, of a whitish or clear yellow colour, without smell, and of a sweet taste, without any peculiar flavour.

*Refined sugar* should have a brilliant white colour, and a close compact texture. It should be very hard but brittle, and break with sharp, semi-transparent, splintery fragments.

*Medical use.*—Sugar, from being a luxury, has now become one of the necessaries of life. In Europe, sugar is almost solely used as a condiment. But it is also a very wholesome and powerful article of nourishment; for during crop time, the negroes in the West Indies, notwithstanding their increased labour, always grow fat. It is in this way also that its internal employment is useful in some diseases, as in sea scurvy; for sugar produces no particular effect as a medicine, except that the coarse and impure kinds are slightly purgative. Applied externally it acts as an escharotic in spongy and unhealthy granulations; and to abraded or inflamed surfaces it proves gently stimulant. In pharmacy it is principally employed to cover bad tastes, to give form to, and to preserve more active substances. In using it for the last purpose, we must always remember, that if the proportion of sugar employed be too small, it will promote, instead of retarding the fermentation of the articles it is intended to preserve.

*Molasses* or treacle is a very impure syrup. It is thick, viscid, of a dark-brown, almost black colour, and has a peculiar smell, and a sweet, somewhat empyreumatic taste.—Treacle is applied to many domestic and economical purposes. It is admirably adapted for covering the taste of nauseous drugs; and in hospital practice may supersede the use of sugar in many instances.

SAGAPENUM. *Dub.* Plantæ nondum descriptæ *Gummi-resina. Ed. Lond.*

Sagapenum. A gum-resin.

THE plant which furnishes the substance is not ascertained, but is conjectured by Willdenow to be the Ferula Persica.

Sagapenum is a concrete juice, brought from Alexandria, either in distinct tears, or agglutinated in large masses. It is outwardly of a yellowish colour; internally somewhat paler, and clear like horn; it grows soft upon being handled, and sticks to the fingers; its taste is hot, nauseous, and bitterish, and its smell disagreeable and alliaceous.

Neumann got from 480 grains, 306 alcoholic and 108 watery extract; and inversely, 170 watery, and 241 alcoholic extract. The alcohol distilled from it was sensibly impregnated with its flavour, and along with the water a considerable portion of volatile oil arose. It is not fusible.

*Medical use.*—In medical virtues it holds a kind of middle place between assafœtida and galbanum, and may be employed in the same manner, and under similar circumstances.

SALIX.

Willd. *g.* 1756.; Smith, *g.* 409. *Diœcia Diandria.*—Nat. ord. *Amentaceæ.*

*Sp.* 10. Willd.; *sp.* 17. Smith. SALIX FRAGILIS. *Dub.*
Crack willow.
CORTEX SALICIS FRAGILIS. *Dub.*

*Sp.* 33. Willd.; *sp.* 45. Smith. SALIX ALBA. *Dub.*
Common white willow.
CORTEX SALICIS. *Dub.*

*Sp.* 101. Willd.; *sp.* 40. Smith. SALIX CAPREA. *Lond.*
Great roundleaved sallow.

*Off.*—The bark.
CORTEX SALICIS. *Lond.*
CORTEX SALICIS CAPREÆ. *Ed.*

THE bark of these as well as of other indigenous species of willow, have been recommended as substitutes for cinchona. The white willow was first introduced into practice by Mr Stone; and strong evidence in favour of the use of the broad-leaved, in debility, intermittents and foul ulcers, has been published by Messrs James, White and Wilkinson. They possess very considerable astringency and bitterness, but differ chemically from cinchona in containing no tannin. An ounce and a half of the dried bark should be first macerated six hours in two pounds of water, and then made to boil in it for ten or fifteen minutes. An ounce or two of this decoction may be given three or four times a-day, or oftener.

SALVIA OFFICINALIS. *Ed. Dub.*

Willd. *g.* 63, *sp.* 7. *Diandria Monogynia.*—Nat. ord. *Verticillatæ.*

Sage.

*Off.*—The leaves.

FOLIA SALVIÆ OFFICINALIS. *Ed.*
SALVIA. *Dub.*

SAGE is a perennial plant, a native of the south of Europe, and cultivated in our gardens. There are several varieties of it differing in size, or in the colour of the flower, but their properties are the same. They have a peculiar aromatic smell, and a warm aromatic taste, with some degree of bitterness and astringency.

*Medical use.*—In its effects, sage agrees with other aromatics. It is stimulant, carminative, and tonic. In cold phlegmatic habits it excites appetite, and proves serviceable in debility of the nervous system. The best preparation for these purposes is an infusion of the dried leaves, drunk as tea, or a tincture, or extract, made with rectified spirit, taken in proper doses; these contain the whole virtues of the sage, the distilled water and essential oil only its warmth and aromatic quality, without any of its roughness or bitterness. Aqueous infusions of the leaves, with the addition of a little lemon-juice, prove an useful diluting drink in febrile disorders, being sufficiently agreeable to the palate.

SAMBUCUS NIGRA. *Ed.*
Willd. *g.* 569, *sp.* 3.; Smith, *g.* 157, *sp.* 2. *Pentandria Trigynia.*—Nat. ord. *Dumosæ.*
Common elder.

*Off.*—*a)* The flowers.
FLORES SAMBUCI NIGRI. *Ed.*
FLORES SAMBUCI. *Lond. Dub.*

*b)* The berries.
BACCÆ SAMBUCI NIGRI. *Ed.*
BACCÆ SAMBUCI. *Dub.*

*c)* The inner bark.
CORTEX SAMBUCI NIGRI. *Ed.*
CORTEX INTERIOR SAMBUCI. *Dub.*

THIS tree is frequent in hedges; it flowers in June, and ripens its fruit in September. The berries contain malic acid, and have a sweetish, not unpleasant taste; nevertheless, eaten in substance, they offend the stomach. For the market, they are gathered indiscriminately from the Sambucus nigra and Ebulus, a very venial fraud, as their effects are exactly the same. They are, however, easily distinguished, by the latter, when bruised, staining the fingers of a red colour, and the former of the colour of a withered leaf.

*Medical use.*—An infusion of the inner green bark of the

trunk in wine, or the expressed juice of the berries in the dose of half an ounce or an ounce, is said to purge moderately, and in small doses to prove an efficacious deobstruent, capable of promoting all the fluid secretions. The expressed juice, inspissated to the consistence of a rob, proves an useful aperient medicine, promotes the natural evacuations, and if continued for a sufficient length of time, is of considerable service in various chronical disorders. The young leaf buds are strongly purgative, and act with so much violence as to be accounted unsafe. The flowers are very different in quality; these have an agreeable aromatic flavour, which they yield in distillation to water, and impart, by infusion, to vinous and spiritous liquors.

SAPO.

*a)* Hard soap, composed of soda and olive oil.

SAPO: Sapo albus Hispanus, ex oleo Oleæ Europææ et soda confectus. *Ed.*

SAPO DURUS: Sapo ex Olivæ oleo et soda confectus (Hispanicus). *Lond.*

SAPO: Durus Hispanicus. *Dub.*

*b)* Soft soap made of oil and potass.

SAPO MOLLIS: Sapo ex oleo et potassa confectus. *Lond. Ed.*

THE general chemical properties of soap have been already noticed. Soap is of two kinds, hard and soft,—hard when it is made with soda, and soft when made with potass. The latter is a strong, but coarse soap, and in medicine is only used externally as a detergent and cataplasm. The officinal species of the former is composed of olive oil and soda. It is only prepared in the countries which produce the oil. For medicinal use we prefer the Spanish.

It should be white and hard, dissolve entirely in water and in alcohol, forming with the former a milky, and with the latter a transparent solution: and the solutions should froth freely on agitation. It should not be variegated in its colour, feel greasy or moist, or be covered with a saline efflorescence; and the solution should not have a rancid smell or taste. Some of the foreign Dispensatories are so very particular about the nature of the soap used in medicine, as to direct it to be prepared by the apothecary, by simply triturating, without the assistance of heat, Provence oil, with half its weight of a solution of soda, of the specific gravity of 1.375 until they unite.

Soap is decomposed by all the acids, earths, and earthy

and metalline salts. The acids combine with the alkali, and separate the oil. The earths form an insoluble earthy soap with the oil, and separate the alkali; while with the salts there is a mutual decomposition, their acid combines with the alkali, and earthy or metalline soaps are formed.

*Medical use.*—The detergent property of soap, or the power it possesses of rendering oily and resinous substances miscible with water, has given rise to very erroneous notions of its medical virtues. It was supposed to render such substances more readily soluble in the juices of the stomach, and in the fluids of the body, and to be well fitted for dissolving such oily or unctuous matters as it may meet with in the body, attenuating viscid juices, opening obstructions of the viscera, and deterging all the vessels it passes through. It has likewise been supposed a powerful menstruum for the urinary calculus; and a solution of soap in lime water has been considered as one of the strongest solvents that can be taken with ssfety into the stomach; for the virtue of this composition has been thought considerably greater than the aggregate of the dissolving powers of the soap and lime-water when unmixed.

How erroneous these ideas are, appears evidently, when we recollect the very easy decomposition of soap, which renders it perfectly impossible that it should enter the circulating system, or indeed come into contact with the fluids even of the mouth, without being decomposed. As to the solution of soap in lime water, we may observe, that it is only a clumsy way of exhibiting a solution of soda; for the soap is decomposed, an insoluble soap of lime is formed, and the soda remains in solution. The internal use of soap should therefore be confined, in our opinion, to the giving form to other substances which are not decomposed by it, and to the decomposing metallic poisons when they have been taken into the stomach. For this last purpose, a teacup-ful of a solution of soap in four times its weight of water may be drunk every three or four minutes, until a sufficient quantity be taken.

Applied externally, soap is a very powerful detergent, and combines the stimulating properties of the alkali with the lubricity of the oil. In this way it often proves a powerful discutient, and a useful application to sprains and bruises.

SCILLA MARITIMA. *Ed. Lond. Dub.*

Willd. *g.* 640, *sp.* 1. *Hexandria Monogynia.*—Nat. ord. *Liliaceæ.*

Squill.

*Off.*—The root.

RADIX SCILLÆ MARITIMÆ. *Ed.*

RADIX SCILLÆ. *Lond. Dub.*

THE squill is a perennial bulbous-rooted plant, which grows wild on the sandy shores of Spain, Portugal, north of Africa, and the Levant.

The root is about the size of the fist, pear shaped, with the apex upwards, and consists of fleshy scales, attenuated at both edges, surrounded by other scales, which are arid, shining, and so thin, that the root, at first sight, seems to be tunicated. The recent root is full of a white viscid juice, has scarcely any smell, but a very bitter, nauseous, and extremely acrid taste. Rubbed on the skin, it inflames and blisters.

It is more commonly met with in the shops in the form of the dried scales, which should be brittle, semi-pellucid, smooth, but marked with lines, and when chewed should feel tenacious, and taste very bitter, without manifest acrimony.

The active constituent of the squill is the acrid principle; and therefore it becomes almost inert by too much drying, or by being kept too long in the form of powder. It also contains bitter extractive, much mucilage, albumen and starch.

*Medical use.*—Given internally in large doses, it produces purging and vomiting, sometimes even strangury, bloody urine, inflammation and erosion of the stomach. In smaller doses, it proves a useful expectorant and diuretic, and it is said to lessen the frequency of the pulse.

Squill is sometimes given as a general stimulant in typhus, especially to cattle. But it is much more frequently exhibited as an expectorant, where the lungs are loaded with viscid matter, and as a diuretic in dropsical cases, for which purpose it is commonly conjoined with calomel.

The dose of squill is one or two grains three or four times a-day; and the most commodious form of its exhibition, unless when designed as an emetic, is that of a bolus or pill: in a liquid form it is to most people too offensive, though rendered less disagreeable both to the palate and stomach by the addition of aromatic distilled waters.

SCROPHULARIA NODOSA. *Dub.*

Willd. *g.* 1152, *sp.* 2.; Smith, *g.* 285, *sp.* 1. *Didynamia Angiospermia.*—Nat. ord. *Personatæ.*

Knotty-rooted figwort.

*Off.*—The herb.

HERBA SCROPHULARIÆ. *Dub.*

THIS is a perennial plant, growing in woods and under hedges. It flowers in July. The roots are grey and knotty,

and have a nauseous smell, and a sweet but somewhat acrid taste, both of which they partly lose by drying.

SINAPIS.

Willd. *g.* 1246. Smith, *g.* 312, *Tetradynamia Siliquosa*—Nat. ord. *Siliquosæ.*

*Sp.* 4. Willd. ; *sp.* 2. Smith. SINAPIS ALBA. *Ed. Dub.*
White mustard.

*Off.*—The seeds.
SEMINA SINAPIS ALBÆ. *Ed.*
SEMINA SINAPI. *Dub.*

*Sp.* 5. Willd. ; *sp.* 3. Smith. SINAPIS NIGRA. *Lond.*
Common mustard.

*Off.*—The seeds.
SEMINA SINAPIS. *Lond.*

THESE plants are both annual, both grow wild in England, and possess similar virtues.

They flower in June and produce small round compressed seeds, which have an acrid bitterish taste, and a pungent smell when reduced to powder. The common mustard has blackish seeds, and is more pungent than the white.

They impart their taste and smell in perfection to aqueous liquors, whilst rectified spirit extracts extremely little of either; the whole of the pungency arises with water in distillation. Committed to the press, they yield a considerable quantity of a bland insipid oil, perfectly void of acrimony : the cake left after the expression is more pungent than the mustard itself.

*Medical use.*—Mustard seed is swallowed entire, to the quantity of a table spoonful or more, to stimulate the stomach in some cases of dyspepsia, and to excite the peristaltic motion of the intestines, especially when they are torpid, as in paralysis. The powder made into a paste with water is commonly used as a condiment with animal food ; infused in water, it proves emetic when taken in considerable doses, and in smaller ones acts as a diuretic and aperient ; but it is more frequently applied externally as a topical stimulus, made into a paste, or sinapism, with vinegar and bread-crumb.

SISYMBRIUM NASTURTIUM. *Ed.*

Willd. *g.* 1238, *sp.* 1. ; Smith, *g.* 306, *sp.* 1. *Tetradynamia Siliquosa.*—Nat. ord. *Siliquosæ.*

Common water-cress.

*Off.*—The recent herb.
HERBA.

This plant is perennial, and grows wild in clear springs, and rivulets throughout Britain. Its leaves remain green all the year, but are in greatest perfection in the spring. They have a pungent smell (when rubbed betwixt the fingers,) and an acrid taste, similar to that of scurvy grass, but weaker. By drying or boiling, they lose their sensible qualities entirely.

*Medical use.*—It acts as a gentle stimulant and diuretic; for these purposes, the expressed juice, which contains the peculiar taste and pungency of the herb, may be taken in doses of an ounce or two, and continued for a considerable time.

SIUM NODIFLORUM. *Dub.*

Willd. *g.* 544, *sp.* 4.; Smith, *g.* 139, *sp.* 3. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Procumbent water parsnip.

*Officinal.*—The herb.

HERBA SII. *Dub.*

THIS plant is perennial, and grows wild in rivers and ditches in England. It flowers in July and August, and was formerly alleged to be not only diuretic, but also emmenagogue and lithontriptic. It is now scarcely employed.

SMILAX SARSAPARILLA. *Ed. Dub. Lond.*

Willd. g. 1800, *sp.* 9. *Dioecia Hexandria.*—Nat. ord. *Sarmentaceæ.*

Sarsaparilla.

*Off.*—The root.

RADIX SMILACIS SARSAPARILLÆ. *Ed.*

RADIX SARSAPARILLÆ. *Lond. Dub.*

THIS root is brought from the Spanish West Indies. It consists of a great number of long fibres, hanging from one head: the long roots, the only part made use of, are of a blackish colour on the outside, and white within, about the thickness of a goose quill, or thicker, flexible, composed of a very small woody heart, surrounded with fibres running their whole length, which renders them extremely apt to split. They have a glutinous, bitterish, not ungrateful taste, and no smell. Inferior kinds of this root are also sold. They are in general thicker, of a paler colour on the outside, and less white within, with a much thicker woody heart. Neumann got from 960 grains, 360 watery, and 10 alcoholic extract, and inversely 240 alcoholic, and 120 watery.

*Medical use.*—It was first brought into Europe by the Spaniards, about the year 1563, with the character of being a specific for the cure of the lues venerea, a disease which made

its appearance a little before that time, and likewise of several obstinate chronic disorders It then lost its reputation, and was considered by many as a very inert mucilaginous substance; and the diaphoresis, which it is sometimes supposed to produce, was entirely ascribed to the warm and diluent regimen employed at the same time. More recently, however, it has come into favour for the cure of many cutaneous affections, and especially of what are called syphiloid diseases; and if upon just grounds, it will explain why it should have been so strongly recommended in syphilis, and why it should have failed.

Soda impura. Subcarbonas sodæ impura. *Lond.*
Carbonas sodæ impurus, v. s. Barilla. *Ed.*
Barilla, s. s. Soda impura. *Dub.*
Impure carbonate of soda. Barilla. Fixed mineral alkali.

Soda is a very common mineral production. It is the basis of sea-salt; and combined with carbonic acid, it is found on the surface of the earth in Egypt, Syria, Barbary, Hungary, &c. and is obtained by the incineration of marine vegetables, especially the salsola soda and kali, the salicornia herbacea, &c. The Spaniards even cultivate these in salt marshes for the sake of the soda. After being cut down, they are dried like hay. A deep pit is then prepared, and a bundle or two of the dried vegetables set on fire are thrown into it. After being well kindled, other bundles are thrown in until the pit is filled. When the incineration is completed, the barilla is found in the bottom, caked into a solid mass, which is worked like a stony substance. Good barilla is firm, hard, heavy, dry, sonorous, spongy, and internally of a blue colour mixed with white spots, does not deliquesce, emits no unpleasant smell on solution, and does not leave a large proportion of insoluble matter. Incinerated soda is mixed with potash, muriate of soda, and other saline matters; mineral soda with clay and other earthy substances. The Egyptian soda was reckoned the best, then the Spanish (barilla,) afterwards the Carthaginian, and that prepared from different species of fuci (kelp) is the worst.

But all these carbonated sodas are inferior in purity to those now manufactured in Britain, by decomposing the sulphate of soda.

That commonly used is obtained by the bleachers as a residuum in their method of preparing oxygenized muriatic acid, by decomposing muriate of soda with sulphuric acid and the black oxide of manganese.

The sulphate of soda is decomposed,

1. By carbonate of potash. Mr Accum has described the manipulations of this mode. A boiling concentrated solution of about 560 pounds of American potashes is ladled into a boiling solution of 500 pounds of sulphate of soda, agitated together, and the whole quickly heated to ebullition. It is then drawn off into leaden cisterns, lined with thick sheet-lead, and allowed to cool in a temperature which should not exceed 55°.

The fluid is then drawn off, and the mass of salt washed with cold water, to free it from impurities, and again put into the boiler with clean water. This second solution is also evaporated at a low heat, as long as any pellicles of sulphate of potass form on its surface, and fall to the bottom of the fluid. The fire is then withdrawn, and the fluid ladled out into the cistern to crystallize. Unless the fluid be allowed to cool pretty low before it is removed to crystallize, the salt obtained will contain sulphate of potass.

2. By acetate of lime. The acetic acid for this purpose is obtained by distillation from wood, during its conversion into charcoal.

3. By litharge or subcarbonate of lead. Very pure carbonate of soda is prepared by this process in the vicinity of Edinburgh.

4. By decomposing the sulphuric acid by charcoal. About 500 cwt. of sulphate of soda and 100 cwt. of charcoal are ground together, and the mixture exposed in a reverberatory furnace until it becomes pasty. It is then transferred into large casks, and lixiviated. The ley is afterwards evaporated and crystallized. By this, or a similar process, very pure carbonate of soda is manufactured in the west of Scotland.

On the continent, muriate of soda is sometimes decomposed by potass, and sometimes by lime

Carbonate of soda is an article of the greatest importance in many manufactures.

*Medical use.*—Carbonate of soda is now much used in medicine. Its primary effect is to correct acidity in the *primæ viæ.* It also acts as a tonic, and in many instances gives great relief in calculous complaints, although there can be little reliance placed upon it as a lithontriptic. Being an efflorescent salt, it is conveniently given in the form of powder, or made up into pills.

MURIAS SODÆ. *Ed.*
SODÆ MURIAS, s. s. Murias sodæ. *Lond.*
SAL COMMUNE, s. s. Murias sodæ. *Dub.*
Muriate of soda. Common sea-salt.

This is the most common of all the neutral salts. It is not only found in immense masses on and under the surface of the earth, and contained in great quantities in many salt springs, but it is the cause of the saltness of the sea.

There are two varieties of native muriate of soda, the lamellar and fibrous. It is found in Poland, Hungary, Spain, England, &c. When necessary, it is purified by solution and crystallization.

Salt springs occur in many parts of the world. The quantity of muriate of soda contained in these varies from an inconsiderable quantity even up to one-third.

Sea-water also varies much in strength. It is said to contain most salt in warm climates, and at great depths.

Muriate of soda, as obtained from its natural solutions by evaporation and crystallization, is commonly mixed with earthy muriates, which, being deliquescent salts, dispose it to attract moisture from the atmosphere. It may, however, be purified by precipitating the earths by means of carbonate of soda, or by washing the crystallized salt with a saturated solution of muriate of soda, heated to ebullition. In this state it is not capable of dissolving any more muriate of soda, but will dissolve a considerable quantity of the earthy muriates.

Muriate of soda has a pure salt taste, is soluble in 2.8 times its weight of water at 60°, and in 2.76 at 212°. It is not soluble in alcohol. By the action of heat it first decrepitates, then melts, and lastly sublimes without decomposition. The primitive form of its crystals is cubic, and they are permanent in the atmosphere. According to Kirwan, they consist of 38.88 muriatic acid, 53 soda, and 8.12 water. It is decomposed by the sulphuric and nitric acids, by potass and baryta, by secondary salts containing these, and by metalline salts whose base forms an insoluble compound with muriatic acid; it is also gradually decomposed by lime, iron, and litharge.

*Medical use.*—Muriate of soda is one of the most important articles in the arts, and in domestic economy. As a medicine, it is useful in some cases of dyspepsia; and in large doses it is said to check vomiting of blood. It is a common ingredient in stimulating clysters, and is sometimes applied externally, as a fomentation to bruises, or in the form of bath, as a gentle stimulus to the whole surface of the body.

Sodæ boras; s. s. Sub-boras sodæ. *Lond.*
Boras sodæ; v. s. Borax. *Ed.*
Borax; s. s. Sub-boras sodæ. *Dub.*
Borate of soda. Sub-borate of soda. Borax.

Borax is found only in Thibet and Persia. It is extracted

from the waters of some wells and lakes by evaporation. In its impure state it is called tincal, and is brought from the East Indies in great masses, composed of a few large crystals, but chiefly of smaller ones, partly white and partly green, joined together as it were by a greasy yellow substance, intermixed with sand, small stones, and other impurities. By repeated solutions, filtrations and crystallizations, it shoots into hexangular prisms, of which two sides are broader than the others, terminated by triangular pyramids, of a white colour, a styptic and alkaline taste, colouring vegetable blues green, soluble in eighteen parts of water at 60°, and in six at 212°, slightly efflorescing in the air, and when heated, swelling, and with the loss of nearly half its weight, forming a porous friable mass, which in a greater heat melts into a transparent glass soluble in water. Besides the acids and alkalies, which have a greater affinity for its acid or basis than these have for each other, it is decomposed by the sulphates, muriates, nitrates, phosphates, and fluates, of all the earths, and of ammonia. It consists of 39 boracic acid, 17 soda, and 44 water.

*Medical use.*—The medical virtues of borax have not been sufficiently ascertained by experience; it is supposed to be, in doses of half a drachm or two scruples, diuretic and emmenagogue. Mr Bisset recommends a solution of the salt in water, as the most powerful dissolvent yet known, of aphthous crusts in the mouth and fauces of children. And for the same purpose, it is often applied, in the form of powder, mixed up with sugar.

SOLANUM DULCAMARA. *Lond. Dub.*

Willd. *g.* 383, *sp.* 15.; Smith, *g.* 100, *sp.* 1. *Pentandria Monadelphia.*—Nat. ord. *Solanaceæ.*

Bitter-sweet. Woody nightshade.

*Off.*—The twigs.

CAULIS SOLANI DULCAMARÆ. *Ed.*

CAULIS DULCAMARÆ. *Lond.*

STIPITES DULCAMARÆ, autumno collecti. *Dub.*

THIS climbing shrub grows wild in moist hedges, has woody brittle stalks, and flowers in June and July. The twigs should be gathered early in spring. The taste, as the name of the plant expresses, is both bitter and sweet; the bitterness being first perceived, and the sweetness afterwards; and when fresh they have a nauseous smell.

*Medical use.*—The dulcamara was formerly much esteemed as a powerful medicine. It is in general said to increase all the secretions and excretions, to excite the heart and arteries, and, in large doses, to produce nausea, vomiting, and convul-

sions; but its effects seem to differ according to the nature of the soil on which it grows, being most efficacious in warm climates, and on dry soils. It has been recommended in cutaneous affections, especially lepra and in syphiloid diseases, in rheumatic and cachectic swellings, in ill-conditioned ulcers, scrofula, indurations from milk, leucorrhœa, jaundice, and obstructed menstruation. It has principally been used in decoction: two or three ounces of that of the London Pharmacopœia may be given thrice a-day, and gradually augmented, till a pint be consumed daily. A stronger decoction may be used externally as a lotion. In the form of extract, from 5 to 10 grains may be given for a dose.

SOLIDAGO VIRGA AUREA. *Dub.*

Willd. *g.* 1483, *sp.* 35.; Smith, *g.* 368, *sp.* 1. *Syngenesia superflua.*—Nat. ord. *Compositæ radiatæ.*

Common golden-rod.

*Officinal.*—The flowers and leaves.

*a)* FLORES VIRGÆ AUREÆ. *Dub.*

*b)* FOLIA VIRGÆ AUREÆ. *Dub.*

THIS plant is perennial, and is found wild on heaths and in woods, producing spikes of yellow flowers from July to September. The leaves have a moderately astringent bitter taste; and thence prove serviceable in debility and laxity of the viscera, and disorders proceeding from that cause.

SPARTIUM SCOPARIUM. *Ed. Dub. Lond.*

Willd. *g.* 1332, *sp.* 19.; Smith, *g.* 321, *sp.* 1. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ.*

Common broom.

*Off.*—The tops and seeds.

*a)* SUMMITATES SPARTII SCOPARII. *Ed.*
CACUMINA SPARTII. *Lond.*
CACUMINA GENISTÆ. *Dub.*

*b)* SEMINA GENISTÆ. *Dub.*

THIS is a very common shrub on dry pastures, flowering in June and July.

The leaves have a very bitter taste, and when given in decoction prove considerably diuretic. The seeds have similar properties.

SPERMACETI; ex Physetere macrocephalo. *Ed.*
CETACEUM; concretum sui generis. *Lond.*
SPERMA CETI; sevum. *Dub.*
Spermaceti.

The spermaceti whale is characterized by his enormous head, great part of which is occupied by a triangular cavity of bone, covered only by the common integuments. In the living animal, this cavity is filled with a white, fluid, oily substance, amounting sometimes to many tons in weight. On the death of the whale, it congeals into a white unctuous mass, from which a considerable quantity of very pure whale oil is obtained by expression. The residuum, afterwards freed from impurities, by washing with water, melting, straining, expressing through linen bags, and, lastly, washing in a weak ley of potass, is the peculiar substance well known by the name of *Spermaceti*, for which, probably on account of its conveying an incorrect idea of the nature of the substance, the London college has substituted *Cetaceum*. It is also contained in solution in the common whale and other fish-oils; for it is often found deposited, by crystallization, in the reservoirs containing them.

The chemical properties of spermaceti have been already noticed. As a medicine, for internal use, it agrees with the fixed vegetable oils; and in the composition of ointments, &c. its place may be very well supplied by a mixture of oil and wax.

SPIGELIA MARILANDICA. *Ed.*

Willd. *g.* 308, *sp.* 2. *Pentandria Monogynia.*—Nat. ord. *Stellatæ.*

Carolina pink.

*Off.*—The root.

RADIX SPIGELIÆ MARILANDICÆ. *Ed.*

RADIX SPIGELIÆ. *Lond. Dub.*

THIS plant is perennial, and grows wild in the southern parts of North America. It is the *Unsteetla* of the Cherokees. The root is celebrated as anthelmintic, particularly for the expulsion of lumbrici from the alimentary canal, and it often affords relief where no worms are discharged. Some order it in doses of ten or fifteen grains, while others give it in drachm doses, alleging that the nervous affections it sometimes produces more readily happen from small doses, as the large ones often purge or puke. Some prefer the form of infusion. An emetic is generally premised; and its purgative effect is assisted by some suitable additions. Infused in wine, it has been found useful in intermittents. Dr Barton recommends it in the insidious remitting fever of children, which often lays the foundation for hydrocephalus.

SPONGIA OFFICINALIS. *Ed. Dub.*
Cl. *Zoophyta.* Ord. *Spongia.*
Sponge.
*Off*—Sponge.
SPONGIA OFFICINALIS. *Ed.*
SPONGIA. *Lond. Dub.*

SPONGE is principally found in the Mediterranean and Red Seas. It was long supposed to be a vegetable production, but it is now universally allowed to belong to that remarkable class of animals called Zoophytes, which are negatively characterized by Cuvier, as having no vertebræ, no sanguiferous vessels, no spinal marrow, and no articulated limbs. The sponges belong to that division of the zoophytes, which are attached to a solid trunk, and are particularized by their base being spongy, friable, or fibrous.

Sponge is a soft, light, very porous and compressible substance, absorbing by capillary attraction a large proportion of any fluid in which it is immersed.

*Medical use.*—From these properties, it is an useful substance in the practice of surgery. When applied to ulcers which are accompanied with a copious discharge, it absorbs the thinner and more acrid fluid, and leaves the ulcers covered with the thicker and blander matter. It is also useful in suppressing hæmorrhagies, when properly applied by compression, by favouring the coagulation of the blood at the mouths of the vessels. It also forms a convenient tent for dilating wounds and fistulous ulcers, especially when prepared by immersing it in melted wax, and keeping it compressed until it cools. On the melting of the wax by the heat of the part to which it is applied, it gradually expands, and affords an uniform and gently dilating pressure.

Burnt sponge is nothing else than charcoal mixed with a little muriate of soda and phosphate of lime.

STANNUM. *Lond. Ed. Dub.*

*Off.*—*a)* Tin-filings.
LIMATURA STANNI. *Lond. Dub. Ed.*

*b)* Powder of tin.
PULVIS STANNI. *Dub. Ed.*

THE general properties of tin have been already mentioned.

It is found,

1. Sulphuretted, and combined with copper. Tin-pyrites.
. Oxydized.

*a.* Combined with oxide of iron and silica. Common tinstone.

*b.* Combined with oxide of iron, and a little arsenic. Fibrous tinstone.

The best tin is found in Cornwall, or is brought from the East Indies. Its purity is estimated by its small specific gravity, and by the crackling noise it makes when bent.

It is now only used as an anthelmintic, especially in cases of tænia, and probably acts mechanically.

Styrax.

Willd. *g.* 874. *Decandria Monogynia.*—Nat. ord. *Bicornes.*

*Sp.* 1. Styrax officinale. *Ed. Lond. Dub.*

*Off.*—The balsam, called storax.

Balsamum styracis officinalis. *Ed.*

Balsamum styracis. *Lond.*

Styrax calamita; resina. *Dub.*

This tree grows in the Levant, Italy, and France. The storax flows from wounds made in the bark, in countries where the heat is sufficient; for neither in France nor in Italy does it furnish any. It occurs either in small distinct tears, of a whitish or reddish colour, or in large masses composed of tears, or in masses of an uniform texture, and yellowish-red or brownish colour; though sometimes likewise interspersed with a few whitish grains.

The *common storax* of the shops is in large masses, considerably lighter and less compact than the foregoing; it appears on examination to be composed of a resinous juice, mixed with saw-dust.

Storax has an agreeable smell and an aromatic taste. Neumann got from 480 grains, 360 alcoholic, and 30 of watery extract; and inversely, 120 watery, and 240 alcoholic. In distillation it yielded benzoic acid. It is therefore a balsam, or natural combination of resin with benzoic acid.

*Sp.* 3. Styrax benzoin. *Ed. Lond. Dub.*

*Off.*—The balsam, called benzoin.

Balsamum styracis benzoïni, *vulgo* Benzoinum. *Ed.*

Benzoinum; balsamum. *Lond.*

Benzoe; resina. *Dub.*

This species grows in Sumatra, and like the former also furnishes a balsam on being wounded, which is brought from the East Indies in large masses, composed of white and light brown pieces, with yellowish specks, breaking very easily be-

twixt the hands: that which is whitest, and freest from impurities, is most esteemed.

In its properties it differs from storax only in containing a larger proportion of benzoic acid. Neumann found that it was totally soluble in alcohol, forming a blood-red tincture, and that water extracted no gummy matter, but a notable proportion of benzoic acid. By sublimation he got two ounces of impure acid from sixteen of benzoin. Lime and the alkaline carbonates dissolve the acid without attacking the resin, and are accordingly employed in the process of Scheele, Gottling, and Gren, for obtaining the benzoic acid. I find that the solution of potass dissolves benzoin very rapidly, forming a dark coloured solution, mixed with fine crystals of benzoat of potass. This alkaline solution is not decomposed by water, but forms with acids a rose-coloured coagulum, easily soluble in excess of acid. Boiling nitrous acid also attacks benzoin with great violence, and dissolves it entirely; the solution becomes turbid, and lets fall a copious precipitate on cooling, which, according to Mr Brande, is benzoic acid. It is decomposed by water, and by alkaline solutions.

Succinum. *Ed. Lond. Dub.*
Amber.

This is a solid, brittle, bituminous substance, dug out of the earth, or found upon the sea-shores, especially along the coasts of Polish Prussia and Pomerania. It is of a white, yellow, or brown colour, sometimes opaque, and sometimes very clear and transparent.

It emits an agreeable smell when heated or rubbed. By friction it becomes electric; and when heated it softens, swells, and then melts, and burns with a greenish or bluish flame, leaving a coaly residuum. By distillation it affords a little acetic acid, an essential oil, and a peculiar acid, named from it the Succinic. It is not acted upon by water or diluted acids. It is imperfectly dissolved in alcohol and ether. Hoffmann dissolved it in oil of almonds in Papin's digester, and in a boiling solution of potass. Dr Thomson has discovered that it is soluble in the cold, even in a very weak solution of the subcarbonate of potass. Heyer ascertained that it was soluble, with decomposition, in nitrous acid. In attempting to form succinic acid by the action of nitrous acid on amber, I made the same observation. The acid, when heated to ebullition, acts violently; copious red fumes are emitted, and the amber is first as if melted, and then dissolved. On cooling, part of the amber separates. The acid solution is decomposed by water, and by alkaline solutions. Amber is rendered

soluble in the fixed and volatile oils, by melting or roasting it, or by the addition of a little camphor.

It is only used in pharmacy for the empyreumatic oil and acid obtained from it.

SULPHAS.

SULPHATE is a generic term for the combination of sulphuric acid with the alkalis, earths, and metallic oxides. Their generic characters have been already noticed. Like the other genera, they may be divided into three families.

Family 1. Alkaline sulphates.—These form no precipitate with alkaline carbonates.

Family 2. Earthy sulphates.—These are either insoluble in water, or, if soluble, form a white precipitate with alkaline carbonates.

Family 3. Metalline sulphates.—These form precipitates, which are often coloured, with alkaline carbonates in general, with prussiate of potass and iron, and with gallic acid.

The sulphate of alumina, sulphate of baryta, and sulphate of magnesia are officinal.

*a)* SULPHUR. *Lond.*
Roll Sulphur.
*b)* SULPHUR SUBLIMATUM. *Lond. Ed.*
SULPHUR SUBLIMATUM. Flores sulphuris. *Dub.*
Sublimed sulphur.

THE physical and chemical properties of sulphur have been already mentioned.

In the neighbourhood of volcanoes it is sometimes found perfectly pure and crystallized; but all the sulphur of commerce is extracted from pyrites by sublimation. It is usually brought to us in large irregular masses, which are afterwards melted and cast into cylindrical rolls, with the addition of some coarse resin, flour, or the like; whence the paler colour of the rolls. Sulphur should be chosen of a bright yellow colour, should be very inflammable, and should burn with a bright pure blue flame.

Sublimed sulphur is never prepared by the apothecary. It has the form of a very fine powder, having a beautiful yellow colour. It is often contaminated with a little sulphuric acid, formed during the process, from which it is easily freed by washing.

*Medical use.*—Sulphur stimulates the system, loosens the belly, and promotes the insensible perspiration: it seems to pervade the whole habit, and manifestly transpires through the pores of the skin, as appears from the sulphureous smell

of persons who have taken it, and from silver being stained in their pockets of a blackish colour. In the stomach it is probably combined with hydrogen. It is a celebrated remedy against cutaneous diseases, particularly psora, both given internally, and applied externally. It has likewise been recommended in rheumatic pains, flying gout, rickets, atropha, coughs, asthmas, and other disorders of the breast and lungs, and particularly in catarrhs of the chronic kind. In hæmorrhoidal affections it is almost specific; but in most of these cases it is advantageously combined with some cooling purgative, especially supertartrate of potass.

SWIETENIA.
Willd. *g.* 843, *Decandria Monogynia.*—Nat. ord. *Trihilatæ.*

*Sp.* 1. SWIETENIA MAHAGONI. *Ed.*
Mahogany tree.
*Off.*—The bark.
CORTEX SWIETENIÆ MAHAGONI. *Ed.*

THIS majestic tree grows principally in Jamaica and in Spanish America. Its useful wood is universally known. Its bark is brown, rough and scaly, on the branches grey and smoother. Its taste is very astringent, and more bitter than that of Peruvian bark. Its smell weak and aromatic. In its action on the living body, it is said to coincide nearly with Peruvian bark, and may be substituted for it in many situations.

*Sp.* 2. SWIETENIA FEBRIFUGA. *Dub.*
Febrifuge Swietenia.
*Off.*—The bark.
CORTEX SWIETENIÆ FEBRIFUGÆ. *Dub.*

THIS species, which in many respects resembles the former, is a native of the East Indies. Its bark is red, brittle and compact, and covered with a rough grey cuticle. In its properties it agrees with the mahogany bark, and forms a very valuable substitute for Peruvian bark in the East Indies, where this last is so dear and scarce, and the diseases in which it is indicated so common. It is, however, merely an astringent bitter, and contains no cinchonin. Dr Roxburgh sent from India a quantity of the extract of this bark, which could not be distinguished from the common kino of the shops.

TAMARINDUS INDICA. *Ed. Dub. Lond.*
Willd. *g.* 1250, *sp.* 1, *Monadelphia Triandria.*—Nat. ord. *Lomentaceæ.*

Tamarind tree.

*Off.*—The preserved fruit.

PULPA TAMARINDI; leguminis pulpa. *Lond.*

FRUCTUS TAMARINDI. *Dub.*

FRUCTUS TAMARINDI INDICÆ. Fructus conditus. *Ed.*

THIS tree grows both in the East and West Indies. The fruit is a broad ash-coloured pod. The external covering is thin and brittle, and contains several hard seeds, enveloped in a soft brown pulp. Tamarinds are preserved in two ways: commonly by throwing hot sugar from the boilers on the ripe pulp: but a better method is to put alternate layers of tamarinds and powdered sugar in a stone jar. By this means the tamarinds preserve their colour, and taste more agreeably.

East India tamarinds are longer than those from the West Indies; the former containing six or seven seeds each, the latter rarely above three or four.

Preserved tamarinds should be fresh and juicy, and should have an agreeable acid taste. They should not have a musty smell; the seeds should not be soft and swollen; and the blade of a knife should not get a coating of copper by being immersed among them.

Tamarinds contain sugar, mucilage, citric acid, supertartrate of potass, tartaric acid, and malic acid.

*Medical use.*—The pulp of these fruits, taken in the quantity of from two or three drachms to an ounce or more, proves gently laxative and purgative, and, at the same time, by its acidity quenches thirst, and allays immoderate heat. It increases the action of the sweet purgatives, cassia and manna, and weakens that of the resinous cathartics.

Salts, whose base is potass, form an improper addition to tamarinds, for they are decomposed, and the tartaric acid of the fruit is precipitated in the form of supertartrate of potass.

TANACETUM VULGARE. *Dub.*

Willd. *g.* 1472, *sp.* 18; Smith, *g.* 360, *sp.* 1. *Syngenesia Polygamia superflua.*—Nat. ord. *Compositæ discoideæ.*

Common tansy.

*Off.*—The leaves.

FOLIA TANACETI. *Dub.*

TANSY is perennial, and grows wild by road-sides and the borders of fields, and is also frequently cultivated in gardens, both for culinary and medicinal uses: it flowers in June and August.

*Medical use.*—Considered as a medicine, it is a moderately warm bitter, accompanied with a strong not very disagreeable flavour. Some physicians have had a great opinion of it in hysteric disorders, particularly those proceeding from a deficiency or suppression of the uterine purgations. The leaves and seeds have been in considerable esteem as anthelmintics. An infusion of tansy drunk as tea, has been strongly recommended as a preventive of the return of gout.

TEUCRIUM.
Willd. *g.* 1093.; Smith, *g.* 259. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*

*Sp.* 12. TEUCRIUM MARUM. *Dub.*
Syrian herb mastich.
*Off.*—The herb.
HERBA MARI SYRIACI. *Dub.*

This is a small shrubby plant, growing spontaneously in Syria, Candy, and other warm climates, and cultivated with us in gardens. The leaves have an aromatic bitterish taste, and when rubbed betwixt the fingers, a quick pungent smell, like volatile alkali, which soon affects the head, and occasions sneezing: distilled with water, they yield a very acrid, penetrating essential oil, resembling that of scurvy-grass. These qualities sufficiently point out the uses to which this plant might be applied.

*Sp.* 36. Willd.; *sp.* 3. Smith. TEUCRIUM CHAMÆDRYS. *Dub.*
Wall germander.
*Off.*—The herb.
HERBA CHAMÆDRYOS. *Dub.*

THIS perennial herb is found plentifully in the isle of Ely and near Cambridge. It flowers in July and August. It is an aromatic bitter, and is considered to be tonic and stimulant. An infusion of it is given in ague, chlorosis, and arthritis.

TOLUIFERA BALSAMUM. *Ed. Lond. Dub.*
Willd. *g.* 828, *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Lomentaceae.*

*Off.*—The balsam called Balsam of Tolu.
BALSAMUM TOLUIFERÆ BALSAMI. *Ed.*
BALSAMUM TOLUTANUM. *Lond. Dub.*

This tree grows in Spanish America; the balsam flows from incisions made in its bark, during the hot season, and is brought to us in little gourd shells. It is of a yellowish-brown colour, inclining to red; in consistence thick and tenacious: by age it grows hard and brittle. The smell of this balsam is extremely fragrant, somewhat resembling that of lemons: its taste warm and sweetish. Lewis says, that he has sometimes procured benzoic acid from it. It yields very little volatile oil, although it impregnates the distilled water strongly with its flavour. By dissolving a proper quantity of sugar in this water, a more elegant syrup is obtained than that prepared in the common way, with a decoction of the balsam. In its medical virtues it agrees with the other balsams.

TORMENTILLA ERECTA. *Ed. Dub.* Willd.
TORMENTILLA OFFICINALIS. *Lond.* Smith.
Willd. *g.* 1001. *sp.* 1.; Smith, *g.* 236, *sp.* 1. *Icosandria Polygynia.*—Nat. ord. *Senticosae.*
Septfoil. Common tormentil.

*Off.*—The root.
RADIX TORMENTILLÆ ERECTÆ. *Ed.*
RADIX TORMENTILLÆ. *Lond. Dub.*

TORMENTIL is perennial, and found wild in woods and on commons: it has long slender stalks, with usually seven long narrow leaves at a joint; the root is for the most part crooked and knotty, of a blackish colour on the outside, and reddish within. It has an austere styptic taste, accompanied with a slight kind of aromatic flavour: it is one of the most agreeable and efficacious of the vegetable astringents, and may be employed with good effect in all cases where medicines of this class are proper. Neumann got from 960 grains, 365 alcoholic, and 170 watery extract; and inversely, 570 watery, and 8 alcoholic.

TRITICUM HYBERNUM. *Ed. Lond. Dub.*
Willd. *g.* 152. *sp.* 2. *Triandria Monogynia.* Nat. ord. *Gramina.*
Wheat.

*Off.*—Flour, starch.
*a)* FARINA; e seminibus. *Lond. Dub.*
*b)* AMYLUM; ex tritico hyberno. *Ed.*
AMYLUM. *Lond. Dub.*

By some, spring and winter wheat are considered only as varieties, not as distinct species. The latter is the most pro-

ductive, and is most commonly cultivated on that account; for there is no material difference in the grains they produce, which are indiscriminately employed for every purpose.

Wheat flour consists principally of gluten, starch, albumen, and a sweet mucilage. These may be separated by forming the flour into a paste with a little water, and washing this paste with fresh quantities of water until it runs from it colourless. What remains is the gluten, which, if not the same with, is very analogous to, the fibrine of animal substances. From the water with which the paste was washed, a white powder, *Amylum,* separates on standing. The albumen and sweet mucilage remain dissolved in the water. By evaporating it, the albumen first separates in white flakes, and the sweet mucilage may be got by total evaporation.

It is the presence of gluten which characterizes wheat flour; and on the due admixture of it with the other constituents depends the superiority of wheat flour for baking bread.

Bread is made by working the flour into paste with water, a quantity of some ferment, such as yeast, and a little muriate of soda to render it sapid, allowing the paste to stand until a certain degree of fermentation take place, and then baking it in an oven, heated to about 488°. During the fermentation, a quantity of gas is formed; and as it is prevented from escaping by the toughness of the paste, and dilated by the heat of the oven, the bread is rendered light and spongy. In this process the nature of the constituents of the flour is altered, for we are not able to obtain either gluten or starch from bread.

*Medical use.*—Bread is not only one of the most important articles of nourishment, but is also employed in pharmacy for making cataplasms, and giving form to more active articles. An infusion of toasted bread has a deep colour and pleasant taste, and is an excellent drink in febrile diseases, and debility of the stomach.

*Amylum.*

*Starch.*—The general properties of starch have been already enumerated. It is found in many vegetables combined with different substances. Fourcroy, accordingly, makes various species of it; as combined,

1. With gluten or fibrine; as in wheat, rye, and other similar seeds.
2. With extractive; as in beans, peas, lupins, &c.
3. With mucilaginous matter; as in the potatoe, and many other roots, in unripe corn.
4. With saccharine matter in most roots, and in corn after it has begun to germinate.

5. With oil; in the emulsive seeds, almonds, &c.
6. With an acrid principle; as in the root of the burdock, jatropha manihot, arum asarum, and other tuberous roots.

*Medical use.*—As a constituent of many vegetable substances, it forms a most important alimentary substance. In a medical point of view, it is to be considered as a demulcent; and accordingly, it forms the principal ingredient of an officinal lozenge, and a mucilage prepared from it often produces excellent effects, both taken by the mouth, and in the form of a clyster in dysentery and diarrhœa, from irritation of the intestines. Externally flour or starch is the usual application in erysipelatous affections of the skin, but upon what principle is not very apparent, unless it be an empirical practice remaining from the pathology which dreaded the repulsion of all external inflammations.

TUSSILAGO FARFARA. *Ed. Lond. Dub.*

Willd. *g.* 1483, *sp.* 12.; Smith, *g.* 360, *sp.* 1. *Syngenesia superflua.*—Nat. ord. *Compositæ radiatæ.*

Colts-foot.

*Off.*—The herb and flowers.

*a)* FOLIA TUSSILAGINIS FARFARÆ. *Ed.*
TUSSILAGO. *Lond.* Folia. *Dub.*

*b)* FLORES TUSSILAGINIS FARFARÆ. *Ed.*

THIS herb grows wild in moist situations, producing yellow flowers in March and April, which soon are succeeded by large roundish leaves, hairy underneath; their taste is herbaceous, somewhat glutinous and subacrid.

*Medical use.*—Colts-foot is recommended in coughs, phthisis, and other disorders of the breast and lungs, and some use it in scrofula. Its effects probably depend more on the milk in which it is commonly directed to be taken, than on the tussilago itself.

ULMUS CAMPESTRIS. *Ed. Lond. Dub.*

Willd. *g.* 505, *sp.* 1.; Smith, *g.* 117, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Scabridæ.*

Common elm.

*Off.*—The inner bark.

CORTEX ULMI CAMPESTRIS. Cortex interior. *Ed.*

CORTEX ULMI. Liber. *Lond.*

CORTEX INTERIOR ULMI. *Dub.*

THIS tree grows wild in Britain. It flowers in April. The inner bark has a yellowish colour, and a mucilaginous, btter, astringent taste, without smell.

In decoction it has been highly recommended in the lepra ichthyosis, and has been said to cure dropsies, but it requires a patient trial.

Valeriana officinalis. *Ed. Dub.* (Sylvestris). *Lond.* Willd. *g.* 75, *sp.* 6.; Smith, *g.* 15, *sp.* 3. *Triandria Monogynia.*—Nat. ord. *Aggregatæ.*
Wild valerian.

*Off.*—The root.
Radix valerianæ officinalis. *Ed.*
Radix valerianæ. *Lond. Dub.*

This plant is perennial, and varies in its appearance and sensible qualities, according to the situation in which it grows. In marshes and shadowy places its leaves are broader, on dry heaths and high pastures they are narrower. The roots produced in low watery-grounds have a remarkably faint smell in comparison with the others, and sometimes scarcely any. The roots taken up in autumn or winter have also much stronger sensible qualities than those collected in spring and summer.

The root consists of a number of strings or fibres matted together, issuing from one common head, of a whitish or pale brownish colour. Its smell is strong, like a mixture of aromatics with fetids; the taste unpleasantly warm, bitterish, and subacrid. Neumann got from 480 grains of the dry root 186 alcoholic, and 74 watery extract; and inversely, 261 watery and 5 alcoholic. The distilled alcohol was slightly, the water strongly, impregnated with the smell of the valerian, but no separable oil was obtained.

*Medical use.*—Wild valerian is a medicine of great use in nervous disorders, proceeding from a debility of the nervous system. Some recommend it as procuring sleep, particularly in fever, even when opium fails; but it is principally useful in affections of the hysterical kind.

The common dose is from a scruple to a drachm in powder; and in infusion, from one to two drachms. Its unpleasant flavour is most effectually concealed by a suitable addition of mace.

As its virtues reside entirely in an essential oil, it should not be exhibited in decoction or watery extract.

Veratrum album. *Ed. Lond. Dub.*
Willd. *g.* 1859, *sp.* 1. *Polygamia Monoecia.*—Nat. ord. *Liliaceae.*

White hellebore.

*Off.* The root.

Radix veratri albi. *Ed.*

Radix veratri. *Lond.*

Radix hellebori albi. *Dub.*

This plant grows spontaneously in Switzerland and the mountainous parts of Germany. The root has a nauseous, bitterish, acrid taste, burning the mouth and fauces. On being wounded, it emits an extremely acrimonious juice, which, when inserted into a wound, produces very violent effects. Neumann got from 960 grains 560 watery and 10 alcoholic extract; and inversely, 420 alcoholic and 180 watery. Nothing rose in distillation.

*Medical use.*—The powder of the dried root, applied to an issue, occasions violent purging; snuffed up the nose, it proves a strong, and not always a safe sternutatory. Taken internally, it acts with extreme violence as an emetic, and has been observed, even in a small dose, to occasion convulsions, and even death. The ancients sometimes employed it in various obstinate cases, and always made this their last resource. According to the very ingenious analysis of Mr Moore, a vinous infusion of white hellebore, with the addition of one-fourth part of laudanum, forms the *Eau Medicinale d' Husson*, so much celebrated as a specific in gout. Mr Moore put his mixture to the test of experiment. He administered it in *four* cases of gout. "In these four cases, the effects of the mixed infusions were precisely the same with equal doses of the eau medicinale. In two of the cases, where two drams were given, vomiting and purging were produced; and in one case, the medicine occasioned constipation, which happens also with the eau medicinale; and the gout in all was relieved."

Veronica beccabunga. *Dub.*

Willd. *g.* 44. *sp.* 30.; Smith, *g.* 9. *sp.* 8. *Diandria Monogynia.*—Nat. ord. *Personatae.*

Brooklime.

*Off.*—The herb.

Herba beccabungæ. *Dub.*

This is a low perennial plant, common in little rivulets and ditches of standing water, and flowering in July. The leaves remain all the winter, but are in great perfection in the spring. Their taste is herbaceous, with a very light bitterness. They contain, along with the volatile acrid principle, vegetable albumen and much sulphate of lime.

If any good effects be expected from brooklime, it should be used as food.

VIOLA ODORATA. *Ed. Dub.*

Willd. *g.* 446, *sp.* 12.; Smith, *g.* 96, *sp.* 2. *Pentandria Monogynia.*—Nat. ord. *Campanaceæ.*

Sweet violet.

*Off.*—The recent flower.

FLORES VIOLÆ ODORATÆ. *Ed.*

FLORES VIOLÆ. *Dub.*

THIS plant is perennial, and is found wild under hedges and in shady places; but the shops are generally supplied from gardens. It flowers in March and April. Its flowers are so remarkable for their odour and colour, that they have given a name to both. In our markets we meet with the flowers of other species: these may be distinguished from the foregoing by their being larger, of a pale colour, and having no smell.

*Medical use.*—They impart their colour and flavour to aqueous liquors: a syrup made from the infusion has long had a place in the shops, and is said to be an agreeable and useful laxative for children, but is chiefly valued as a delicate test of the presence of uncombined acids or alkalies, the former changing its blue to a red, and the latter to a green.

VITIS VINIFERA. *Ed. Dub. Lond.*

Willd. *g.* 453, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Hederaceae.*

The vine.

THE vine grows in temperate situations in many parts of the world, and is cultivated very generally for the sake of its agreeable subacid fruit. Before they are ripe, grapes are extremely harsh and acid, and by expression furnish a liquor which is called Verjuice. It contains malic acid, super-tartrate of potass, and extractive, and may be made to furnish wine by the addition of sugar. As the grape advances to maturity, the quantity of sugar in it increases, while that of malic acid diminishes: it, however, never disappears entirely. When thoroughly ripe, the grape is one of the most agreeable fruits. It is cooling, antiseptic and nutritious, and when eaten in considerable quantity, diuretic, and gently laxative. In inflammatory diseases, and all others where acids are indicated, grapes form an excellent article of diet.

*Off.*—Sun-raisins.

Fructus vitis viniferæ. Fructus siccatus. *Ed.*

Uvæ passæ sole siccatæ. *Dub.*

Uvæ passæ ; baccae præparatæ. *Lond.*

Raisins are grapes which have been carefully dried. By this means not only the water they contained is dissipated, but the quantity of acid seems to be diminished. They become more saccharine, mucilaginous, and laxative, than the recent grape, but are less cooling.

*Off.*—Sherry.

Vinum album hispanum; Anglice *Sherry.* *Ed.*

Vinum; Vinum album Hispanicum, Anglice *Sherry* *Lond.*

Wine is the juice of the grape altered by fermentation. The numerous varieties of wine depend principally on the proportion of sugar contained in the must, and the manner of its fermentation. When the proportion of sugar is sufficient, and the fermentation complete, the wine is perfect and generous: if the quantity of sugar be too large, part of it remains undecomposed, as the fermentation is languid, and the wine is sweet and luscious: if, on the contrary, it be too small, the wine is thin and weak; and if it be bottled before the fermentation be completed, it will proceed slowly in the bottle, and, on drawing the cork, the wine will sparkle in the glass, as, for example, Champaigne. When the must is separated from the husk of the grape before it is fermented, the wine has little or no colour: these are called White wines. If, on the contrary, the husks are allowed to remain in the must while the fermentation is going on, the alcohol dissolves the colouring matter of the husks, and the wine is coloured: such are called Red wines. Besides, in these principal circumstances, wines vary much in flavour.

The following Tables exhibit a comparative view of the contents of different Wines and Spiritous Liquors. The first is taken from Mr Brande's paper in Phil. Trans. vol. 101. The second is from Neumann.

| | *Strongest.* | *Medium.* | *Weakest.* |
|---|---|---|---|
| Rum, | | 53.68 | |
| Brandy, | | 53.39 | |
| Hollands, | | 51.60 | |
| Raisin wine, | | 25.77 | |
| Port, | 25.83 | 23.49 | 21.40 |
| Madeira, | 24.42 | 22.27 | 19.34 |
| Marsala, | 25.87 | 21.56 | 17.26 |
| Currant wine, | | 20.55 | |
| Constantia, | | 19.75 | |
| Sherry, | 19.83 | 19.17 | 18.25 |
| Lisbon, | | 18.94 | |
| Bucellas, | | 18.49 | |
| Red Madeira, | | 18.40 | |
| Cape muscat, | | 18.25 | |
| —— Madeira, | | 18.11 | |
| Grape wine, | | 18.11 | |
| Calcavalla, | | 18.10 | |
| White hermitage, | | 17.43 | |
| Rousillon, | | 17.26 | |
| Malaga, | | 17.26 | |
| Malmsey Madeira, | | 16.40 | |
| Sheruaz, | | 15.52 | |
| Syracuse, | | 15.28 | |
| Nice, | | 14.63 | |
| Claret, | 16.32 | 14.44 | 12.91 |
| Tent, | | 13.30 | |
| Burgundy, | 14.53 | 13.24 | 11.95 |
| White champagne, | | 12.80 | |
| Vin de Grave, | | 12.80 | |
| Frontignac, | | 12.79 | |
| Cote roti, | | 12.32 | |
| Red hermitage, | | 12.32 | |
| Gooseberry wine, | | 11.84 | |
| Hock, | 14.37 | 11.62 | 8.88 |
| Tokay, | | 9.88 | |
| Elder wine, | | 9.87 | |
| Cyder, | | 9.87 | |
| Perry, | | 9.87 | |
| Ale, | | 8.88 | |
| Brown stout, | | 6.80 | |

The first column in this Table shews the quantity of rectified spirit; the second that of thick, oily, unctuous, resinous matter; the third of gummy and tartareous matter; and the fourth of water in 17280 parts.

| | I. | II. | III. | IV. |
|---|---|---|---|---|
| Malmsey, | 1920 | 2100 | 1140 | 12120 |
| Alicant, | 1800 | 2900 | 100 | 12840? |
| Neufchatel, | 1560 | 1920 | 900 | 12900 |
| French, | 1440 | 400 | 60 | 15380 |
| Frontignac, | 1440 | 1680 | 320 | 13830 |
| Muscadine, | 1440 | 1200 | 480 | 14160 |
| Salamanca, | 1440 | 1680 | 960 | 13200 |
| Sherry, | 1440 | 2880 | 1080 | 11880 |
| Tinto, | 1440 | 3120 | 840 | 11880 |
| Hermitage, | 1380 | 600 | 100 | 15200 |
| Monte Pulciano, | 1320 | 180 | 160 | 15620 |
| Carcassone, | 1320 | 250 | 80 | 15630 |
| Champagne, | 1280 | 400 | 60 | 15540 |
| Canary, | 1140 | 1200 | 2160 | 12780 |
| Madeira, | 1140 | 1560 | 960 | 13620 |
| Moselle, | 1080 | 260 | 90 | 15850 |
| Rhenish, | 1080 | 200 | 94 | 15906 |
| Tokay, | 1080 | 2100 | 2400 | 11700 |
| Burgundy, | 1080 | 240 | 100 | 15860 |
| Old Rhenish, | 960 | 480 | 140 | 15700 |
| Pontac, | 960 | 320 | 120 | 15880 |
| White Brandenburgh, | 960 | 420 | 180 | 14880? |
| Vin de grave, | 960 | 360 | 120 | 15840 |
| Red Brandenburgh, | 840 | 280 | 120 | 16040 |
| Aland, | 840 | 1560 | 780 | 14100 |
| Red Tyrol, | 720 | 600 | 240 | 15120 |
| Spanish, | 600 | 1200 | 4560 | 10920 |

*Medical use.*—Wine, taken in moderate quantities, acts as a beneficial stimulus to the whole system. It promotes digestion, increases the action of the heart and arteries, raises the heat of the body, and exhilarates the spirits. Taken to excess, it produces inebriety, which is often succeeded by headach, stupor, nausea, and diarrhœa, which last for several days. Habitual excess in wine debilitates the stomach, produces in-

flammation of the liver, weakens the nervous system, and gives rise to dropsy, gout, apoplexy, tremors, and cutaneous affections.

To convalescents, and in all diseases of general debility, and deficiency of the vital powers, wine is the remedy on which we must place our chief dependence. It is contra-indicated in all inflammatory complaints, and when it sours upon the stomach.

WINTERA AROMATICA. *Ed.*

Willd. *g.* 1063. *Polyandria Tetragynia.*—Nat. ord. *Oleraceæ.*

*Off.*—Winter's bark.

CORTEX WINTERÆ AROMATICÆ. *Ed.*

THIS is the produce of a tree first discovered on the coast of Magellan by Captain Winter, in the year 1567. The sailors then employed the bark as a spice, and afterwards found it serviceable in the scurvy, for which purpose it is at present also sometimes made use of in diet drink. The true Winter's bark is not often met with in the shops, Canella alba being generally substituted for it; and by some they are reckoned to be the same: there is, however, a considerable difference betwixt them in appearance, and a greater in quality. The Winter's bark is in large pieces, of a more cinnamon colour than the canella, and much warmer and more pungent. Its smell resembles that of cascarilla. Its virtues reside in a very hot, stimulant, volatile oil.

ZINCUM. *Ed. Dub. Lond.*

Zinc.

THE general properties of zinc have been already noticed. It is always found oxidized,

1. Combined with a greater or less proportion of carbonic acid. Calamine.
2. Combined with sulphur. Blende.
3. Combined with sulphuric acid, generally in solution.

The ores of zinc are rarely worked by themselves, or with the sole intention of extracting zinc, but are generally melted with the lead ores, particularly galena, which they commonly accompany. By this process the zinc is obtained in two forms; part of it is sublimed in the state of an oxide, and attaches itself to the chimney of the furnace, in the form of a grey, granular, earthy like incrustation, which is known by the name of Tutty or Cadmia; and part of it is sublimed in its metallic form, and is condensed in the throat of the chim-

ney, in small grains, which are afterwards melted in a crucible, and cast in ingots.

Oxidum zinci impurum. *Ed.*
Tutia. *Dub.*
Impure oxide of zinc. Tutty.

It is moderately hard and ponderous; of a brownish colour, and full of small protuberances on the outside, smooth and yellowish within; some pieces have a bluish cast, from minute globules of zinc in its metallic form. Tutty is celebrated as an ophthalmic, and frequently employed as such in unguents and collyria.

Carbonas zinci impurus, v. s. Lapis calaminaris. *Ed.*
Calaminaris, Oxydum zinci in usum eorum, qui Orichalcum conficiunt. *Dub.*
Calamina, s. s. Carbonas zinci impura. *Lond.*
Impure carbonate of zinc. Calamine.

This mineral is found plentifully in England, Germany, and other countries, either in distinct mines, or intermingled with the ores of different metals. It is usually of a greyish, brownish, yellowish, or pale reddish colour, without lustre or transparency; fracture commonly uneven or earthy; considerably hard. Before the blowpipe it decrepitates, but does not melt, and becomes yellower, and is sublimed. It is partly soluble in acids, and often effervesces with them.

Mr Smithson has analysed several varieties of calamine. England and Carinthia furnish the best. Its specific gravity is 4.33, and it contains 65 *per cent.* of oxide of zinc, while the calamine from Hungary and Fribourg has a specific gravity of 3.5, and contains from 25 to 50 *per cent.* of quartz.

Calamine is generally roasted before it comes into the shops, to render it more easily reducible into a fine powder. In this state it is employed in collyria, against defluxions of thin acrid humours upon the eyes, for drying up moist running ulcers, and healing excoriations.

# APPENDIX.

## NO. I.

*List of Substances contained in some of the latest and most esteemed Foreign Pharmacopœias, but not inserted in the Materia Medica of any of the British Colleges.*

EXPLANATION OF THE ABBREVIATIONS.

1. Brem.—Pharmacopœia in usum officinarum reipublicæ Bremensis conscripta. 8vo. Bremæ, 1792.

2. Aust. prov.—Pharmacopœia Austriaco-provincialis, emendata. 8vo. Viennæ, 1794.

3. Aust. cast.—Pharmacopœia Austriaco-castrensis. 8vo. Ticini, 1795.

4. Ross.—Pharmacopœia Rossica. 8vo. Petropoli, 1798.

5. Mar.—Apparatus medicaminum nosocomiis generatim curationi ægrotorum pauperum maxime accommodus Francisci Marabelli. 8vo. Pataviæ, anno Reipub. Gall. VIto, 1798.

6. Bor.—Pharmacopœia Borussica. 4to. Berolini, 1799.

7. Gen.—Formulario Farmaceutico per usu dell' Ospedale di Pammatone. 8vo. Genovæ, 1800.

8. Van. M.—Pharmacopée manuelle, par J. B. Van Mons. 8vo. A Bruxelles, an. IX. 1801.

9. Swed.—Materia Medica. Auctore F. Swediaur, M. D. 2 vols 12mo. Parisiis, an. VIII.

10. Brugn.—Pharmacopœia ad uso degli speziali, e medici moderni della republica Italiana, di L. Brugnatelli. 8vo. Pavia 1802.

11. La G.—Manuel du Pharmacien, par E. J. B. Bouillon La Grange. 8vo. A Paris, an. XI, 1803.

12. Parm.—Code Pharmaceutique, à l'usage des hospices civiles, des secours à domiciles et des prisons, publié par ordre du Ministre de l'interieur. Par A. A. Parmentier. 8vo. Paris, 1803.

13. Al.—Nouveaux Elemens de Therapeutique et de Matiere Medicale. Par J. L. Alibert. 8vo. Paris, an. XII.

14.—Coxe.—The American Dispensatory, by John Redman Coxe, M. D. Philadelphia, 1806.

15. Wylie.—Pharmacopœia castrensis Ruthena, auctore Jacobo Wylie. 8vo. Petropoli, 1808.

16. Thacher.—The American New Dispensatory by James Thacher. 8vo. Boston, 1810.

17. Niem.—Pharmacopœia Batava cum notis, &c. Editore J. F. Niemann. 8vo. Lipsiæ, 1811.

1, ACHILLEA MILLEFOLIUM. *Millefolii herba, flores.* Ross. Aust. prov. Brem. Bor. La G.

Smell somewhat aromatic ; taste slightly astringent and bitterish ; effects stomachic and tonic.

2, ACHILLEA NOBILIS. *Millefolii nobilis herba, flores.* Ross. Smell camphoraceous and aromatic, preferable in every respect to the preceding species.

3, ACHILLEA PTARMICA. *Ptarmicæ radix ; herba cum floribus.* Ross.

No smell ; taste acrid ; effects sialogogue, sternutatory.

4, ADIANTHUM CAPILLUS VENERIS. *Capillus veneris ; herba.* Aust. prov. Van M. La G.

Used for preparing the syrup called Capillaire.

5. AGARICUS MUSCARIUS. Ross.

Smell fetid , taste acrid; effects inebriating, and inducing delirium.

6. ALCEA ROSA. *Malvæ arboreæ flores.* Ross. Brem. Bor.

No smell ; taste mucilaginous and sub-astringent ; effects emollient and sub-astringent.

7, AMBRA AMBROSIACA GRYSEA. *Ambra grysea.* Ross. Bor. Van M.

Smell agreeable ; taste resinous and aromatic ; effects exciting and augmenting the nervous power.

8, AMOMUM CURCUMA. Van M. *Curcumæ radix.* Bor.

Taste bitterish, aromatic.

9, AMOMUM GRANA PARADISI. *Grana paradisi.* Brem. La G.

Smell slightly aromatic ; taste acrid ; effects stimulating.

10, AMYGDALUS NANA. *Nuclei.* Ross.

No smell , bitterish taste ; a substitute for sweet almonds.

11, AMYGDALUS PERSICA. *Flores.* Van M. La G.

Aromatic ; bitter ; laxative.

12. ANAGALIS ARVENSIS. *Anagallis. Herba.* Aust. prov. Brem. Ross. Bor.

No smell ; taste at first herbaceous, afterwards bitter, and somewhat acrid.

13. ANDROMEDA MARIANA. Coxe.

Probably poisonous ; used in decoction as a wash for the ground itch or toe itch of the slaves in America.

14, ANEMONE PRATENSIS. *Pulsatillæ nigricantis herba.* Ross. Aust. prov. Brem.

Smell slight ; taste acrid, caustic, durable ; effects diuretic and stimulant.

15, ANEMONE NEMOROSA. *Ranunculi albi flores, et herba recens.* Ross.

Smell slight ; taste acrid ; effects rubefacient and blistering.

16, ANONA TRILOBA. *Fructus siccatus.* Coxe.

Purgative.

17, Antirrhinum Linaria. *Linaria.* Aust. prov. Brem. Bor. Smell urinous; taste bitterish; effects diuretic.

18, Aralia Spinosa. *Cortex, baccæ.* Coxe. Rheumatism, toothach; acrid, sudorific, sialogogue.

19, Aralia Nudicaulis. *Radix.* Coxe. Tonic; a substitute for sarsaparilla.

20, Aristolochia Clematitis. *Aristolochia vulgaris. Radix.* Ross.

Smell fragrant, but heavy; taste bitter, durable; effects diuretic, emmenagogue.

21, Aristolochia Longa. *Radix.* La G.

22, Aristolochia Rotunda. *Radix.* Brem. Bor. La G. Smell, taste, and effects similar to those of the preceding species.

23, Aristolochia Sipho. Coxe. Substitute for snake-root.

24. Aristolochia Trilobata. *Stipites; radix.* Ross. Smell fragrant, strong; taste bitterish, corresponding with the smell; effects diaphoretic.

25, Artemisia Pontica. *Absinthium ponticum; herba.* Aust. prov.

Similar to A. absinthium, but weaker.

26, Arum Triphyllum. *Radix recens.* Coxe. Acrid; expectorant; boiled in milk, in consumption; as a poultice in tinea capitis.

27, Asarum Canadense. *Succus foliorum expressus. Folium.* Coxe.

Emetic; errhine.

28, Asclepias Decumbens. *Radix.* Coxe. Escharotic, cathartic, sudorific, diuretic.

29, Asclepias Vincetoxicum. *Radix.* La G. Stimulant, cordial; diaphoretic.

30, Asparagus Sativa. *Radix.* La G. Taste bitter-sweet; mucilaginous; aperitive, imparting its smell to the urine.

31, Asplenium Scolopendrium. *Folia.* Van M. Sub-astringent.

32, Astragalus Excapus. *Radix.* Ross. Aust. prov. Brem. No smell; taste bitterish and sub-astringent; effects demulcent, and falsely supposed anti-syphilitic.

33, Aurum. La G. tonic, antisyphilitic?

34, Bellis Perennis. *Flos. Folium.* Aust. prov. No smell; taste slightly acrid.

35, Betonica Officinalis. *Folia.* La G. Aperitive.

36, Betula Alnus. *Alni folia.* Ross.
No smell; taste astringent and bitterish; effects discutient and vulnerary.

37, Bismuthum, vulgo Marcasita. Bor.
A very brittle, fusible, and volatile metal. White oxide has specific effects in Gastrodynia.

38, Bitumen Asphaltum. *Asphaltum.* Bor.
A black friable bitumen, shining in its fracture.

39, Boletus Laricis. *Agaricus albus. Agaricus chirurgorum.* Brem. Aust. prov. Bor. Van M. La G.
Taste nauseous and bitter: effects emetic, cathartic, drastic.

40, Boletus Salicis. Bor.
An unequally porous fungus growing on the willow, and diffusing an aromatic smell, especially after rain.

41, Bolus Alba. Aust. prov.

42, Bolus Armena. Aust. prov. Bor. Van M.

43, Bolus Gallicus.
No smell; adheres to the tongue; effects exsiccative.

44, Borago Officinalis. *Folia, flores.* Van M. La G.
Saline; aperitive.

45, Bos Taurus.
*Lac vaccinum.* Aust. prov. Gen. Bor. Van M. Nutritious; demulcent.

*Serum lactis vaccini.* Mar.
Attenuant; antiseptic.

*Saccharum lactis.* Bor.
Nutritious; demulcent.

*Butyrum.* Van M.
Unctuous.

*Sevum bovinum.* Ross. Aust. cast.
Unctuous, emollient.

*Fel tauri.* Bor. Mar. Van M.
Stomachic.

46, Brassica (Eruca). *Erucæ semina.* Ross. Bor.
Smell heavy: taste acrid; effects stimulant.

47, Brunella Vulgaris. *Folia.* La G.
Vulnerary; astringent.

48, Bubon Macedonicum. *Semina.* La G.
Acrid, aromatic.

49, Buglossum Officinalis. *Folia, flores.* La G.
Demulcent.

50, Calendula Officinalis. *Calendula.* Aust. prov. Van M.
Taste bitterish.

51, Cannabis Sativa. *Cannabis. Semina.* Ross. Brem. Bor. Van M.
Smell weak; taste mawkish; effects emollient, anodyne.
52, Carduus Marianus. *Carduus Mariae. Semina.* Brem.
Emulsive.

53, Carex Arenaria. *Radix.* Ross. Bor.
Smell agreeable, but not strong; effects demulcent, resolvent.

54, Carlina Acaulis. *Carlinae, seu Cardopathiæ radix.* Bor. La G.
Taste very acrid and bitter; smell somewhat aromatic, but nauseous.

55, Carthamus Tinctorius. *Grana.* La G.
Cathartic.

56, Cassia Marilandica. *Folia.* Coxe.
Purgative.

57, Ceratonia Siliqua. *Siliqua dulcis.* Ross. Aust. prov. Brem. Bor.
No smell; taste sweet; effects edulcorant, expectorant.

58, Chelidonium Majus. *Radix, herba recens.* Ross. Aust. prov. Brem.
Smell heavy; taste acrid, bitterish, durable; effects acrid, purgative; when dried, aperient, diuretic.

59, Chenopodium Ambrosioides. *Chenopodii herba.* Brem. Bor. Van. M.
Smell strong, fragrant; taste acrid, aromatic; effects stimulant, carminative, anthelmintic.

60, Chenopodium Botrys. *Botrys vulgaris. Herba.* Ross. Van M.
Qualities and effects similar to, but stronger than those of the preceding species.
61, Chenopodium Anthelminticum. *Succus expressus. Semen.* Coxe.
Smell strong; taste aromatic, bitter, acrid; effects anthelmintic.

62, Chironia Angularis. *Herba.* Coxe.
Bitter; tonic.

63, Chiorium Intybus. *Cichorii radix, herba.* Ross. Aust. prov. *et* cast. Brem. La G. Van M. Gen. Bor. Mar.
No smell; taste of the herb agreeably bitter, of the root intensely bitter; effects aperient, tonic, diuretic.

64, Cicuta virosa. *Herba.* Bor.
Smell heavy; narcotic.

65, Cissampelos Pareira. *Pareira Brewa Radix.*
No smell; taste sweet-bitter. Nephritic complaints.

66, Cistus Creticus. *Resina.* Niem.
Fragrant resin.

67, Clematis Erecta. *Flammulæ Jovis folia, flores.* Ross. Aust. prov. Bor. Van M.

Smell weak; taste acrid, blistering; effects diuretic, sudorific.

68, Clematis Crispa. *Clematis viorna. Folia.* Coxe.

Acrid; chronic rheumatism, palsy, old ulcers; doses small.

69, Cleome Dodecandra. *Radix.* Coxe.

Fetid; anthelmintic.

70. Coluber Vipera. La G.

Nutritious.

71. Conferva Dichotoma. *Fucus helminthocortos. Helminthocorton.* Ross. Brem. Gen. Bor. Mons.

Smell marine, fetid; taste saline; effects purgative, anthelmintic.

72, Convallaria Majalis. *Liliorum convallium flores.* Bor. Mons. La G.

Aromatic; cephalic.

73, Convolvulus Americanus. *Mechoacanha; radix.* Brem. La G.

Taste at first sweetish, then sub-acrid; effects purgative.

74, Convolvulus Turpethum. *Radix.* Van M.

Cathartic.

75, Convolvulus Panduratus. *Radix.* Coxe.

Purgative; and in calculous complaints.

76, Cordia Myxa. *Fructus.* La G.

Pectoral.

77, Cornus Florida. *Cortex.* Coxe.

Astringent, bitter; intermittents, flatulent colic.

78, Cornus Sericea. *Cortex.* Coxe.

Intermittents.

79, Cucumis Melo. *Melo. Semen.* Aust. prov.

Emulsive.

80, Cucurbita Pepo. *Pepo. Semen.* Aust. prov. Bor.

Emulsive.

81, Cycas Circinalis. *Saga grana.* Ross. Brem.

Amylaceous; nutritious.

82, Cynoglossum Officinale. *Radix.* Van M. La G.

Astringent; inspissant.

83, Cynomorium Coccineum. *Fungus Melitensis:* Ross.

No smell; taste styptic, bitterish, saline; effects roborant, astringent.

84, Cytinus Hypocistis. *Hypocistis succus inspissatus.* Aust. prov.

Taste acrid, austere; effect astringent.

85, Dictamnus Albus. *Radix.* Aust. prov. Brem. Bor. La G.

Smell fragrant; taste bitter, sub-aromatic; effects tonic, anthelmintic.

86, Digitalis Epiglottis. *Folia.* Gen.
An Italian substitute for the D. purpurea.

87, Diospyros Virginiana. *Cortex, fructus maturus.* Coxe.
Intermittents, ulcerous sore throats, worms.

88, Dirca Palustris. *Cortex recens.* Coxe.
Epispastic.

89, Dracontium Pertusum. *Folia.* Coxe.
Anasarca: diaphoretic, epispastic.

90, Epidendrum Vanilla. *Vanillæ siliqua.* Ross, Van M. La G.
Smell fragrant, balsamic; taste aromatic, sub-acrid, unctuous; effects heating, diuretic.

91, Erigeron Philadelphicum. Coxe.
Gout, gravel, emmenagogue, diuretic, sudorific.

92, Eryngium Campestre. *Radix.* La G.
Aperitive; diuretic.

93, Eryngium Aquaticum. Coxe.

94, Erysimum Officinale. *Erysimum herba.* Brem. La G.
Taste acrid; effects astringent, diuretic.

95, Eupatorium Cannabinum. *Folia.* Van M.
Smell acrid, penetrating; taste intensely bitter; diuretic; emetic; cathartic.

96, Eupatorium Perfoliatum. *Flores, folia.* Coxe.
Bitter, sudorific; emetic; intermittents, fevers.

97, Euphorbia Ipecacuanha. *Radix.* Coxe.
Emetic.

98, Euphrasia Officinalis. *Herba.* Van M. La G.
Ophthalmic.

99, Fagara Octandra. *Tacamahaca. Gummi-resina.* Ross. Bor.
Smell fragrant, like lavender; taste bitterish, nauseous; effects tonic, stimulant.

100, Ficus Indica Religiosa. *Laccae Gummi.* Ross. Brem. Bor.
Resinous.

101, Formica Rufa. *Formicæ cum acervo.* Ross. Brem. Bor.
Qualities and effects depend on the little acetous acid they contain.

102, Fragaria Vesca. *Radix.* Van M.
Refrigerant; diuretic.

103, Frasera Carolinensis. *Radix.* Coxe.
A substitute for gentian.

104, Gadus Lota. *Mustela fluviatilis. Liquamen hepatis.* Aust. prov.
Nauseous; diuretic, cathartic; chronic rheumatism.

105, Galega Virginiana. *Radix.* Coxe.
Anthelmintic.

106, Gentiana Pannonica. *Gentiana Radix.* Aust. prov. et cast.
Qualities and effects the same as those of the gentiana lutea.

107, Geranium Maculatum. *Radix.* Coxe.
Cholera infantum, syphilis.

108, Geum Rivale. *Gei palustris radix.* Ross.
Smell weak; taste styptic, austere; effects tonic, astringent, febrifuge.

109, Glecoma Hederacea. *Hedera terrestris. Herba.* Aust. prov. Brem. Bor. Van M. La G.
Taste bitterish, sub-acrid; effects expectorant, roborant.

110, Glycyrrhiza Echinata. *Liquiritia, radix.* Bor.
A Russian substitute for the G. glabra.

111, Gualtheria Procumbens. Coxe.
Stimulant, anodyne; asthma.

112, Guilandina Moringa. *Nuces Behen.* Bor.
Oily.

113, Hedera Helix. *Gummi-resina.* La G.
Agglutinant.

114, Heuchera Americana. *Radix.* Coxe.
Astringent, wounds, ulcers, cancers.

115, Hydrastis Canadensis. *Radix.* Coxe.
Bitter, strong narcotic smell; tonic, ophthalmia, cancer.

116, Hypericum Quadrangulare. *Hypericum. Flores.* Brem.
Smell agreeable; taste bitterish, sub-astringent; balsamic; effects vulnerary.

117, Ilex Aquifolium. *Aquifolii folia.* Ross. Bor.
No smell; taste astringent; effects febrifuge, anti-arthritic.

118, Illicium Anisatum. *Anisatum stellatum. Fructus.* Aust. prov. Brem. Ross. Bor. Van M. La. G.
Smell aromatic; taste agreeable, like anise; effects pectoral, carminative, diuretic.

119, Imperatoria Ostruthium. *Imperatoriæ radix.* Ross. Aust. prov.
Smell aromatic; taste warm, pungent, very durable; effects stimulant, carminative, sudorific, diuretic.

120, Iris Versicolor et Verna. Coxe.
Cathartic.

121, Jasminum Officinale. *Jasmini flores.* Ross. Brem.
Smell fragrant; taste bitterish; used as a perfume.

122, Juglans Cinerea. *Cortex interior.* Coxe.
Epispastic; cathartic.

123, Kalmia Latifolia. *Folia.* Coxe.
Narcotic, tinea capitis, herpes, psora, syphilis.

124, Lactuca Sativa. *Folia.* La G.
Refreshing, anodyne.

125, Lamium Album. *Flores.* Van M. La G.
Astringent; tonic.

126, Laurus Pechurim. *Faba.* Van M.
Bitter, aromatic; stimulant, stomachic.

127, Ledum Palustre. *Rorismarini sylvestris herba.* Ross. Aust. prov. Bor.
Smell heavy, sub-aromatic; taste bitterish, sub-astringent; effects resolvant, diuretic.

128, Lepidum Sativum. *Folia, semina.* La G.
Antiscorbutic, aperitive, diuretic.

129, Lichen Pulmonarius. La G.
Taste saline, bitter; pectoral.

130, Ligusticum Levisticum. *Levistici herba, radix, semen.* Ross. Aust. prov. Brem. Bor.
Smell unpleasant; taste warm, aromatic; effects stimulant, carminative, sudorific.

131, Liquidambar Styracifluum. *Styrax liquida. Balsamum.* Aust. prov. Bor. Van M. La G.
Smell fragrant; taste acrid, aromatic; effects stimulating, heating.

132, Liquidambar Asplenifolium. Coxe.
Diarrhœa, hæmorrhagy.

133, Liriodendron Tulipifera. *Cortex.* Coxe.
Intermittents, gout, rheumatism.

134, Lonicera Diervilla. *Diervillae stipites.* Ross.
Taste and smell nauseous; effects antivenereal.

135, Lopeziana. *Radix.* Van M.
Syphilis.

136, Loranthus Europæus. *Viscum quercinum lignum.* Aust. prov.
Smell nauseous; taste astringent, mucilaginous; effects tonic.

137, Lupinus Albus. *Farina.* Gen.
Farinaceous, bitter.

138, Lycoperdon Bovista. Ross.
No taste or smell; effects mechanical, suppression of hæmorrhagy.

139, Lycopodium Clavatum. *Lycopodii semen.* Ross. Brem. Bor. La G.
No taste or smell; effects absorbent.

140, Lytta Vittata. Coxe.
Epispastic.

141, Malva Rotundifolia. *Folia et flores.* Gen.
Demulcent.

142, Maranta Galanga. *Galangæ radix.* Ross. Aust. prov. Brem. Bor. Van M. La G.

Smell fragrant; taste aromatic, pungent, biting; effects stomachic, heating.

143, Maranta Arundinacea. *Radix.* Coxe.

Amylaceous, nutritive.

144, Matricaria Chamomilla. Van. M. *Chamomillæ vulgaris flores, herba.* Ross. Aust. prov. *et* cast. Brem. Bor. Mar.

Smell strong; taste bitter, warmish; effects stomachic, discutient; substitute for chamomile.

145, Matricaria Parthenium. *Matricaria, Flos, herba.* Aust. prov Bor. Van M. La G.

Smell nauseous; taste bitter; effects stomachic.

146, Medeola Virginiana. *Radix.* Coxe.

Diuretic; dropsies.

147, Melia Azedarach. *Radicis cortex.* Coxe.

Anthelmintic; lumbrici, tænia, tinea capitis.

148, Melissa Calamintha. *Folia.* La G.

Anti-hysteric.

149, Meloe Proscarabæus. Aust. prov. *Meloë majalis.* Brem. *Vermis majalis.* Ross. Bor.

No smell; taste acrid; effects stimulating, diuretic, caustic.

150, Mentha Crispa. *Herba.* Ross. Aust. prov. Brem. Gen. Mar. Van M.

Smell fragrant, strong; taste warm, aromatic; slightly bitter; effects resolvant, stomachic, carminative.

151, Mentha Aquatica. *Mentha rubra. Oleum distillatum.* Aust. cast.

Similar to the former.

152, Mercurialis Annua. *Herba.* Van M. La G.

Purgative.

153, Mimosa Senegal. *Arabicum gummi.* Brem.

Supposed to produce the finest gum-arabic.

154, Myrobolanus Cidrina. *Cortex fructuum. Terminaliae species?* Aust. prov.

Taste astringent; effects astringent.

155, Narcissus Pseudo-narcissus. *Flores.* Van M.

Fragrant; antispasmodic.

156, Nigella Sativa. *Nigella. Semen.* Brem. La G.

Smell fragrant; taste acrid, aromatic, effects stimulating, errhine, sialogogue, anthelmintic.

157, Nymphæa Lutea. *Radix.* La G.

Demulcent.

158, Ocimum Basilicum. Van M. *Basilici herba.* Bor.

Smell fragrant; expectorant.

159, Ononis Spinosa. *Ononis radix.* Aust. prov. Mar.
No smell; taste sweetish; effects diuretic.

160, Onopordium Acanthium. *Cardui tomentosi herba recens.* Ross.
No smell; taste bitterish; effects specific, the cure of cancerous affections.

161, Orchis Mascula, Morio, Militaris, Maculata, Pyramidalis et Latifolia. *Salep, Satyrium. Radix.* Ross. Aust. prov. *et* cast. Brem. Bor. Van M.
Taste amylaceous; effects nutritious.

162, Origanum Dictamnus. *Dictamnus creticus. Herba.* Brem.
Smell slight, aromatic; taste aromatic; effects stimulant.

163, Orobanche Virginiana. *Radix.* Coxe.
Nauseous bitter, astringent; dysentery, obstinate ulcers, cancer.

164, Oryza Sativa. *Oryzae semen decorticatum.* Ross. Van M.
Taste farinaceous; effects nutritious, astringent.

165, Pæonia Officinalis. *Pæoniae radix.* Ross. Brem. Bor. La G.
Smell unpleasant; taste at first sweetish, then disagreeably bitter; effects antispasmodic.

166, Phellandrium Aquaticum. *Semen.* Ross. *Fœniculum aquaticum.* Brem. Bor.
Smell heavy; taste aromatic, acrid; effects stimulating, resolvant.

167, Phœnix Dactylifera. *Fructus.* Van M. La G.
Demulcent.

168, Phosphorus. Coxe.
Tonic; poisonous; burning.

169, Physalis Alkekengi. *Bacca.* Van M. La G.
Diuretic.

170, Phytolacca Decandra. *Phytolaccae herba recens, radix.* Ross.
No smell; taste acrid, corrosive; effects corrosive in cancer.

171, Pimpinella Saxifraga. *Pimpinellae albae radix.* Ross. Aust. prov. Brem. Bor. La G.
Smell fragrant; taste warm, acrid; effects stomachic, diaphoretic, diuretic.

172, Pinus Pinea. *Pinus sativa. Nuclei.* Aust. prov.
Taste sweet, bland; effects nutritious.

173, Pistacia Vera. *Fructus.* La G.
Nourishing; analeptic.

174, Plantago Media. *Plantaga. Herba.* Aust. prov.
Taste sub-astringent; effects astringent.

175, Plantago Psyllium et Cynops. *Psyllii semen.* Ross. Bor.
Taste nauseous, mucilaginous, then acrid; effects relaxant.

176, Podophyllum Peltatum. *Radix.* Coxe.
Purgative, anthelmintic; dose 20 grains; leaves poisonous; fruit esculent.

177, Polygala Amara. *Herba, radix.* Ross. Brem. Gen. Bor. Van M.
No smell; taste bitter; acidulous, mucilaginous; effects demulcent, roborant.

178, Polygala Vulgaris. *Polygala. Radix.* Aust. prov. Mar.
Taste sweetish, bitter; effects tonic, expectorant; substitute for seneka.

179, Polypodium Vulgare. *Polypodii radix.* Ross. Aust. prov. Brem. Bor.
Taste at first sweet, then nauseous, bitter, and astringent; effects demulcent, resolvant.

180, Populus Balsamifera. *Tacamahaca. Gummi-resina.* Ross. Van M.
Smell fragrant; taste nauseous, bitterish; effects stimulant, tonic.

181, Populus Nigra. *Gemmae.* Van M.
Emollient, soporiferous.

182, Populus Tremula. *Cortex.* Coxe.
Tonic, stomachic; intermittents.

133, Prinos Verticillatus. *Cortex.* Coxe.
Astringent, bitter, pungent: tonic, intermittents.

184, Prunus Cerasus. *Cerasorum rubrorum acidorum fructus.* Ross. Brem. Bor
Taste acidulous, sweetish; effects refrigerating, antiseptic.
*Cerasorum nigrorum aqua.* Aust. prov.
Narcotic.

185, Prunus Lauro-cerasus. *Lauro-cerasi folia.* Ross. Brem. Bor.
Smell fragrant; taste bitter, like that of bitter almonds; effects highly deleterious; narcotic, resolvant, diuretic.

186, Prunus Virginiana. *Cortex.* Coxe.
Bitter, astringent, aromatic, narcotic; tonic, anthelmintic.

187, Pteris Aquilina. *Filicis fœminae radix.* Ross.
Smell nauseous; taste viscid, bitterish; effects anthelmintic.

188, Pulmonaria Officinalis. *Folia.* La G.
Anti-phthisical.

189, Pyrola Umbellata. *Folia.* Coxe.
Astringent, stimulant, epispastic: tonic; diuretic.

190, Pyrus Malus. *Poma acidula.* Bor. Van M:
Acidulous.

191, Rana Esculenta. La G.
Nutritious.

192, Ranunculus Sceleratus. *Herba.* Coxe.
Acrid; epispastic.

193, Ramnus Zizyphus. *Fructus.* Van M.
Lubricant; expectorant.

194, Rheum Rhaponticum. *Radix.* La G.
Astringent.

195, Rhodendron Maximum. *Folia.* Coxe.
Poisonous; chronic rheumatism.

196, Rubus Arcticus. *Baccae.* Ross. La G.
Smell fragrant; taste acidulous, vinous; effects refrigerant; antiscorbutic. Similar properties are possessed by the fruits of the *rubus idaeus, caesius, fructicosus, chamaemorus.*

197, Rumex Acutus. *Lapathum acutum. Radix.* Aust. prov. Brem. Bor. Mar. Van M. La G.
Taste bitterish; acidulous; effects astringent.

198, Sagus Farinaria. *Medulla.* Van M.
Nutritious.

199, Salvia Horminum. *Folia.* La G.
Astringent, tonic.

200, Sambucus Ebulus. *Ebulus. Radix.* Aust. prov.
Smell fetid; taste nauseous, bitter, acrid; effects drastic, cathartic, emetic, narcotic.

201, Sanguinaria Canadensis. *Semen, radix, succus expressus,* Coxe.
Emetic, purgative, expectorant, narcotic, acrid, tonic.

202, Sanicula Europæa. *Folia.* La G.
Harsh, herbaceous taste.

203, Saponaria Officinalis. *Saponariae radix.* Ross. Aust. prov. *et* cast. Brem. Bor. Mar. Van M. La G.
No smell; taste slightly sweet, bitter and glutinous; effects detergent.

204, Scabiosa Succisa. *Radix.* La G.
Alexipharmic.

205, Scabiosa Arvensis. *Scabiosa. Folium.* Aust. prov. Van M.
Taste slightly bitter; effects expectorant, vulnerary.

206, Scandix Cerefolium. *Cerefolii herba, succus.* Brem. Aust. prov.
Smell weak, balsamic; taste aromatic, balsamic; effects aperient, pectoral, diuretic.

207, Scorzonera Hispanica. *Scorzonera. Radix.* Aust. prov. Bor.
Taste sweetish; effects aperient, demulcent.

208, Secale Cereale. *Secalis farina.* Aust. prov. Gen. Van M.
Taste farinaceous; effects nutritious.

209, SEMPERVIVUM TECTORUM. *Sedi majoris folia virentia.* Ross. Aust. prov. Brem.
Smell weak; taste sub-acrid, slightly styptic; effects refrigerant, astringent.

210, SENECIO JACOBÆA. *Herba.* Van M.
Anthelmintic.

211, SEPIA OCTOPODA. *Sepiae os.* Brem.
A carbonate of lime agglutinated by animal gluten.

212, SILENE VIRGINICA. *Radix.* Coxe.
Anthelmintic.

213, SIUM SISARUM. *Ginseng. Radix.*
Bitter sweet, tonic.

214, SMILAX CHINA. *Chinae radix.* Aust. prov. Brem.
No smell; taste mucilaginous; effects sudorific, antivenereal.

215, SOLANUM NIGRUM. *Herba.* Bor. Van M. Mar.
Smell nauseous; effects diuretic, narcotic.

216, SPIGELIA ANTHELMIA. *Herba cum radice.* Ross. Brem.
Taste and smell fetid; effects narcotic, purgative, anthelmintic.

217, SPIRÆA TRIFOLIATA. *Radix.* Coxe.
Emetic.

218, STRYCHNOS NUX VOMICA. *Nux vomica.* Bor. Van M. La G.
No smell; taste intensely bitter; effects tonic, narcotic, deleterious.

219, SYMPHITUM OFFICINALE. Van M. La G. *Symphiti radix.* Ross. *Consolida major.* Aust. prov. Brem.
No smell; taste mucilaginous; effects emollient, inspissant.

220, TESTUDO FEROX, &c. La G.
Nutritious.

221, TEUCRIUM CHAMÆPITYS. *Chamaepityos herba.* Ross.
Smell fragrant; taste bitter and aromatic; effects tonic.

222, THEOBROMA CACAO. Van M. La G. *Cacao. Nucleus. Oleum.* Ross. Aust. prov. Brem. Bor.
Little smell; taste pleasant and oily, very slightly astringent and bitterish; effects nutritious. Oil bland, sweetish; effects emollient, lubricating.

223, THYMUS SERPYLLUM. *Serpylli herba.* Ross. Aust. prov. Brem. Bor. La G.
Smell fragrant; taste aromatic, bitterish; effects stimulant, diuretic, emmenagogue.

224, THYMUS VULGARIS. *Thymi herba.* Ross. Brem. La G.
Smell fragrant; taste warm, pungent, bitter; effects stimulant, diuretic, emmenagogue.

225, TILIA EUROPÆA. *Flores.* Van M. La G.
Fragrant, anodyne.

226, TRIFOLIUM MELILOTUS OFFICINALIS. *Meliloti herba cum floribus.* Ross. Aust. prov. Brem. Bor. Van M.

Smell fragrant; taste herbaceous, bitterish; effects discutient.

227, TRIOSTEUM PERFOLIATUM. *Radicis cortex.* Coxe.

Diuretic, cathartic, emetic.

228, TRITICUM REPENS. Van M. La G. *Graminis radix.* Ross. Aust. prov. *et* cast. Brem. Gen. Bor.

Smell herbaceous; taste sweetish; effects aperient, demulcent.

229, ULMUS AMERICANA. *Cortex.* Coxe.

Esculent, emollient.

230, VACCINIUM MYRTILLUS. *Myrtilli baccæ.* Ross. Aust. prov.

No smell; taste acidulous, sub-astringent; effects refrigerant, astringent.

231, VACCINIUM OXYCOCCOS. *Oxycocci baccae.* Ross.

Taste acidulous; effects refrigerant, antiseptic.

232, VACCINIUM VITIS IDÆA. *Vitis idaeae baccae, folia.*

Taste acidulous; effects refrigerant.

233, VERATRUM SABADILLA. Van M. *Sabadillae semen.* Ross. Aust. prov. *et* cast. Brem. Bor. Mar. La G.

Taste very bitter, acrid, and caustic; effects stimulant, drastic, cathartic, anthelmintic, errhine.

234, VERATRUM LUTEUM. *Radix.* Coxe.

Pungent, narcotic, bitter; tonic, anthelmintic.

235, VERBASCUM THAPSUS. Van M. La G. *Verbasci flores, folia.* Ross. Aust. prov. Brem. Bor. Mar.

Taste of the leaves herbaceous, bitterish; effects emollient, discutient; smell of the flowers sweet; taste sweet; effects pectoral.

236, VERBENA OFFICINALIS. *Folia.* La G.

Vulnerary.

237, VERONICA OFFICINALIS. *Folia.* M. La G.

Vulnerary; pectoral.

238, VICIA FABA. *Faba. Semen.* Aust. prov.

Taste farinaceous; effects nutritious.

239, VIOLA TRICOLOR. *Herba.* Ross. Aust. prov. *Jacea Hebra.* Brem. Bor. Mar. Van M.

Smell agreeable; taste mucilaginous, bitterish; effects anodyne.

240, VISCUM ALBUM. Bor. La G.

Glutinous; specific; anti-paralytic; anti-epileptic.

241, VITIS VINIFERA APYRENA. *Passulae minores.* Ross. Brem.

Taste sweet, acidulous; effects refrigerant, demulcent, lubricating.

242, ZANTHORHIZA APIIFOLIA. *Radix.* Coxe.

Bitter; tonic.

243, ZANTHOXYLUM CLAVA HERCULIS. *Cortex.* Coxe.

Stimulant, sialogogue; rheumatism, toothach.

## No. II.

*List of Animals which furnish Articles of the Materia Medica, arranged according to Cuvier's System.*

### MAMMALIA.

| | |
|---|---|
| Rodentia. | Castor fiber. |
| Pachydermata. | Sus scrofa. |
| Ruminantia. | Moschus moschiferus. |
| | Cervus elaphus. |
| | Ovis aries. |
| | Bos taurus. |
| Cetacea. | Physeter macrocephalus. |

### AVES.

| | |
|---|---|
| Gallinæ. | Phasianus gallus. |
| Anseres. | Anas anser. |

### Pisces.

| | |
|---|---|
| Chondroptergygii. | Acipenser sturio, stellatus, huso, ruthenus. |

### CRUSTACEA.

| | |
|---|---|
| Canceres. | Cancer pagurus, astacus. |

### INSECTA.

| | |
|---|---|
| Coleoptera. | Cantharis vesicatoria. *(Meloë vesicatorius.)* |
| | ——— trianthema. |
| | Meloë proscarabæus. |
| Hymenoptera. | Cyneps querci folii. |
| | Apis mellifera. |
| | Formica rufa. |
| Hemiptera. | Coccus cacti. |
| Gnathaptera. | Oniscus asellus. |

### MOLLUSCA.

| | |
|---|---|
| Cephalopoda. | Sepia officinalis. |
| Acephala. | Ostrea edulis. |

### VERMES.

| | |
|---|---|
| | Hirudo medicinalis. |

### ZOOPHYTA.

| | |
|---|---|
| Ceratophyta. | Gorgonia nobilis. *(Isis nobilis.)* |
| Spongia. | Spongia officinalis. |

## No. III.

*List of the Genera of Medical Plants, arranged according to the Linnæan System.*

Cl. I. MONANDRIA.

Ord. Monogynia. Kæmpferia.
Curcuma.
Amomum.
Costus.
Maranta.
Lopezia.

Cl. II. DIANDRIA.

Ord. Monogynia. Olea.
Veronica.
Gratiola.
Verbena.
Rosmarinus.
Salvia.

Ord. Trigynia. Piper.

Cl. III. TRIANDRIA.

Ord. Monogynia. Valeriana.
Crocus.
Iris.

Ord. Digynia. Saccharum.
Avena.
Secale.
Triticum.
Hordeum.

Cl. IV. TETRANDRIA.

Ord. Monogynia. Scabiosa.
Plantago.
Penæa.
Rubia.
Fagara.
Santalum.
Alchemilla.
Dorstenia.

Ord. Digynia. Cuscuta.

Cl. V. PENTANDRIA.

Ord. Monogynia. Pulmonaria.
Symphitum.
Borago.
Cynoglossum.
Anagallis.
Anchusa.
Spigelia.
Menyanthes.
Convolvulus.
Datura.
Hyosciamus.
Nicotiana.
Verbascum.
Chironia.
Cordia.
Strychnos.
Capsicum.
Solanum.
Physalis.
Atropa.
Cinchona.
Lobelia.
Psychotria.
Cephaëlis.
Lonicera.
Rhamnus.
Vitis.
Viola.
Ribes.
Hedera.
Gentiana.

Ord. Digynia. Chenopodium.
Ulmus.
Eryngium.
Sanicula.
Daucus.
Conium.
Sium.
Cuminum.
Ferula.
Bubon.
Angelica.
Coriandrum.
Phellandrium.
Imperatoria.
Cicuta.
Carum.
Pastinaca.
Anethum.
Apium.
Pimpinella.

Ord. Trigynia. Sambucus.
Rhus.

Ord. Pentagynia. Linum.

Cl. VI. HEXANDRIA.

| | |
|---|---|
| Ord. Monogynia. | Loranthus. |
| | Berberis. |
| | Narcissus. |
| | Allium. |
| | Aloë. |
| | Convallaria. |
| | Dracæna. |
| | Scilla. |
| | Asparagus. |
| | Lilium. |
| | Acorus. |
| | Calamus. |
| Ord. Digynia. | Oryza. |
| Ord. Trigynia. | Colchicum. |
| | Rumex. |

Cl. VII. HEPTANDRIA.

| | |
|---|---|
| Ord. Monogynia. | Æsculus. |

Cl. VIII. OCTANDRIA.

| | |
|---|---|
| Ord. Monogynia. | Amyris. |
| | Vaccinium. |
| | Daphne. |
| Ord. Trigynia. | Coccoloba. |
| | Polygonum. |

Cl. IX. ENNEANDRIA.

| | |
|---|---|
| Ord. Monogynia. | Laurus. |
| Ord. Trigynia. | Rheum. |

Cl. X. DECANDRIA.

| | |
|---|---|
| Ord. Monogynia. | Myroxylon. |
| | Toluifera. |
| | Cassia. |
| | Guilandina. |
| | Dictamnus. |
| | Hæmatoxylon |
| | Swietenia. |
| | Guaiacum. |
| | Ruta. |
| | Quassia. |
| | Ledum. |
| | Rhododendron |
| | Arbutus. |
| | Styrax. |
| | Copaifera. |
| Ord. Digynia. | Saponaria. |
| | Dianthus. |
| Ord. Pentagynia. | Oxalis. |
| Ord. Decagynia. | Phytolacca. |

Cl. XI. DODECANDRIA.

| | |
|---|---|
| Ord. Monogynia. | Asarum. |
| | Garcinia. |
| | Canella. |
| | Portulacca. |
| | Lythrum. |
| Ord. Digynia. | Agrimonia. |
| Ord. Trigynia. | Euphorbia. |

Cl. XII. ICOSANDRIA.

| | |
|---|---|
| Ord. Monogynia. | Cactus. |
| | Eugenia. |
| | Myrtus. |
| | Punica. |
| | Eucalyptus. |
| | Amygdalus. |
| | Prunus. |
| Ord. Pentagynia. | Pyrus. |
| Ord. Polygynia. | Rosa. |
| | Rubus. |
| | Tormentilla. |
| | Fragaria. |
| | Potentilla. |
| | Geum. |

Cl. XIII. POLYANDRIA.

| | |
|---|---|
| Ord. Monogynia. | Papaver. |
| | Chelidonium. |
| | Cistus. |
| | Tilea. |
| | Nymphæa. |
| Ord. Digynia. | Pæonia. |
| Ord. Trigynia. | Delphinum. |
| | Aconitum. |
| Ord. Tetragynia. | Wintera. |
| Ord. Pentagynia. | Nigella. |
| Ord. Polygynia. | Clematis. |
| | Helleborus. |

Cl. XIV. DIDYNAMIA.

| | |
|---|---|
| Ord. Gymnospermia. | Glecoma. |
| | Hyssopus. |
| | Mentha. |
| | Lavandula. |
| | Teucrium. |
| | Lamium. |
| | Satureja. |
| | Marrubium. |
| | Thymus. |
| | Ocimum. |
| | Origanum. |
| | Melissa. |

Ord. ANGIOSPERMIA. Euphrasia.
Scrophularia.
Digitalis.

Cl. XV. TETRANDYNAMIA.
Ord. SILICULOSÆ. Cochlearia.
Lepidum.
Raphanus.
Cardamine.
Sinapis.
Sisymbrium.

Cl. XVI. MONADELPHIA.
Ord. TRIANDRIA. Tamarindus.
Ord. POLYANDRIA. Malva.
Althæa.

Cl. XVII. DIADELPHIA.
Ord. HEXANDRIA. Fumaria.
Ord. OCTANDRIA. Polygala.
Ord. DECANDRIA. Pterocarpus.
Spartium.
Genista.
Lupinus.
Dolichos.
Astragalus.
Trifolium.
Glycyrrhiza.
Geoffroya.
Trigonella.

Cl. XVIII. POLYADELPHIA.
Ord. DECANDRIA. Theobroma.
Ord. ICOSANDRIA. Citrus.
Ord. POLYANDRIA. Melaleuca.
Hypericum.

Cl. XIX. SYNGENESIA.
Ord. POLYGAMIA ÆQUALIS.
Cicoreum.
Scorzonera.
Leontodon.
Lactuca.
Carlina.
Arctium.
Carthamus.
Cynara.
Carduus.
Ord. POLYGAMIA SUPERFLUA.
Artemisia.
Tanacetum.

Ord. POLYGAMIA SUPERFLUA.
Bellis.
Matricaria.
Arnica.
Inula.
Solidago.
Senecio.
Tussilago.
Anthemis.
Achillea.
Ord. POLYGAMIA FRUSTRANEA.
Centaurea.
Ord. POLYGAMIA NECESSARIA.
Calendula.

Cl. XX. GYNANDRIA.
Ord. DIANDRIA. Orchis.
Epidendrum.
Ord. HEXANDRIA. Aristolochia.
Ord. DODECANDRIA. Cytinus.
Ord. POLYANDRIA. Arum.

Cl. XXI. MONOECIA.
Ord. TETRANDRIA. Betula.
Morus.
Urtica.
Ord. POLYANDRIA. Quercus.
Juglans.
Liquidambar.
Ord. MONADELPHIA. Pinus.
Ricinus.
Croton.
Ord. SYNGENESIA. Momordica.
Cucumis.
Cucurbita.
Bryonia.

Cl. XXII. DIOECIA.
Ord. DIANDRIA. Salix.
Ord. TETRANDRIA. Viscum.
Ord. PENTANDRIA. Pistacia.
Cannabis.
Humulus.
Ord. HEXANDRIA. Smilax.
Ord. OCTANDRIA. Populus.
Ord. MONADELPHIA. Juniperus.
Cissampelos.

Cl. XXIII. POLYGAMIA.
Ord. MONOECIA. Veratum.
Mimosa.

Ord. MONOECIA. Parietaria.
Ord. DIOECIA. Fraxinus.
Panax.
Ord. TRIOECIA. Ficus.
Ceratonia.

Cl. XXIV. CRYPTOGAMIA.
Ord. FILICES. Polypodium.
Adiantum.
Ord. MUSCI. Lycopodium.
Ord. ALGÆ. Lichen.
Conferva.
Ord. FUNGI. Agaricus.
Boletus.
Lycoperdon.

Cl. XXV. PALMÆ.
Cocos.
Phœnix.
Sagus.

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*List of Officinal Genera, arranged according to the Natural System of Jussieu, improved by Ventenat.*

Cl. I. ACOTYLEDONES.
Ord. 1. FUNGI. Lycoperdon.
Boletus.
Agaricus.
2. ALGÆ. Conferva.
Lichen.
Plataphyllum.
3. HEPATICÆ.
4. MUSCI. Lycopodium.
5. FILICES. Polypodium.
Pteris.
Adiantum.
Cycas.

MONOCOTYLEDONES.
Cl. II. STAMINA HYPOGYNIA.
Ord. 1. PLUVIALES.
2. AROIDEÆ. Arum.
Acorus.
3. TYPHOIDEÆ.
4. CYPEROIDEÆ.
5. GRAMINEÆ. Saccharum.
Lolium.
Hordeum.
Triticum.
Secale.
Avena.
Oryza.

Cl. III. PERIGYNIA.
Ord. 1. PALMÆ. Calamus.
Areca.
Cocos.
Sagus.
Phœnix.
Ord. 2. ASPARAGOIDEÆ.
Dracæna.
Asparagus.
Convallaria.
3. SMILACEÆ. Smilax.
4. IONACEÆ. Veratrum.
Colchicum.
5. ALISMOIDEÆ.
6. LILACEÆ.
a. Asphodeloideæ.
Scilla.
Allium.
b. Gloriosæ.
Lilium.
c. Aloideæ.
Aloë.
7. NARCISSOIDEÆ.
Narcissus.
8. IRIDEÆ. Iris.
Crocus.

Cl. IV. EPIGYNIA.
Ord. 1. SCITAMINEÆ.
2. DRYMYRHIZÆ.
Amomum.
Kæmpferia.
3. ORCHIDEÆ. Orchis.
Vanilla.
4. HYDROCHARIDEÆ.

DICOTYLEDONES.
*FLORES APETALI.*
Cl. V. EPIGYNIA.
Ord. 1. ASAROIDEÆ.
Aristolochia.
Asarum.
Cytinus.

Cl. VI. PERIGYNIA.
Ord. 1. ELÆAGNOIDEÆ.
2. DAPHNOIDEÆ. Daphne.
3. PROTEOIDEÆ.
4. LAURINEÆ. Laurus.
Myristica.
5. POLYGONEÆ. Coccoloba.
Polygonum.
Rumex.
Rheum.
6. CHENOPODEÆ.
Phytolacca.
Chenopodium.

Cl. VII. HYPOGYNIA.
Ord. 1. AMARANTHOIDEÆ.
2. PLANTAGINEÆ.
Plantago.
Psyllium.
3. NYCTAGINEÆ. Mirabilis.
4. PLUMBAGINEÆ.

*B. MONOPETALI.*
Cl. VIII. HYPOGYNIA.
Ord. 1. PRIMULACEÆ.
2. OROBANCHOIDEÆ.
3. RHINANTHOIDEÆ.
Polygala.
Veronica.
4. ACANTHOIDEÆ.
5. LILACEÆ. Fraxinus.
6. IASMINEÆ. Olea.
7. PYRENACEÆ.
8. LABIATÆ. Rosmarinus.
Salvia.
Teucrium.
Hyssopus.
Lavandula.
Mentha.
Glecoma.
Marrubium.
Origanum.
Thymus.
Melissa.
Ocimum.
9. PERSONATÆ. Digitalis.
Gratiola.
10. SOLANEÆ. Hyosciamus.
Nicotiana.
Datura.
Atropa.
Solanum.
Capsicum.
Ord. 11. SEBESTENÆ. Cordia.
12. BORAGINEÆ. Anchusa.
13. CONVOLVULACEÆ.
Convolvulus.
14. POLYMONACEÆ.
15. BIGNONEÆ.
16. GENTIANEÆ.
Menyanthes.
Gentiana.
Chironia.
Spigelia.
17. APOCINEÆ. Asclepias.
18. HILOSPERMÆ.

Cl. IX. PERIGYNIA.
Ord. 1. EBENACEÆ. Styrax.
2. RHODORACEÆ.
Rhododendron.
Ledum.
3. BICORNES. Arbutus.
Vaccinium.
4. CAMPANULACEÆ.
Lobelia.

Cl. X. EPIGYNIA, *with United Antheræ.*
Ord. 1. CICHORACEÆ. Lactuca.
Taraxacum.
Cichorium.
Scolymus.
2. CINAROCEPHALÆ.
Cinara.
Arctium.
Centaurea.
3. CORYMBIFERÆ.
Anthemis.
Achillea.
Solidago.
Inula.
Tussilago.
Arnica.
Matricaria.
Tanacetum.
Artemisia.
Absinthium.

Cl. XII. EPIGYNIA, *with Distinct Antheræ.*
Ord. 1. DIPSACEÆ. Valeriana.
2. RUBIACEÆ. Galium.
Rubia.
Cinchona.
Psychotria.
Coffea

Ord. 3. Caprifolaceæ.
Diervilla.
Sambucus.
Cornus.
Hedera.

*C. POLYPETALI.*

Cl. XII. EPIGYNIA.

Ord. 1. Araliaceæ. Panax.
2. Umbelliferæ.
Pimpinella.
Carum.
Apium.
Anethum.
Pastinaca.
Imperatoria.
Scandix.
Coriandrum.
Phellandrium.
Cuminum.
Bubon.
Sium.
Angelica.
Ligusticum.
Ferula.
Cicuta.
Daucus.
Eryngium.

Cl. XIII. HYPOGYNIA.

Ord. 1. Ranunculaceæ.
Clematis.
Helleborus.
Delphinium.
Aconitum.
2. Tulipiferæ. Illicium.
3. Glyptospermæ.
4. Menispermoideæ.
5. Berberideæ. Berberis.
6. Papaveraceæ.
Papaver.
Chelidonium.
Fumaria.
7. Cruciferæ. Raphanus.
Sinapis.
Sisymbrium.
Cardamine.
Cochlearia.
Nasturtium.
8. Capparideæ.
9. Saponaceæ.
10. Malpighiaceæ.
Hippocastanum.

Ord. 11. Hypericoideæ.
Hypericum.
12. Guttiferæ.
Mangostana.
13. Hesperideæ. Citrus.
14. Meliaceæ. Canella.
Swietenia.
15. Sarmentaceæ. Vitis.
16. Geranoideæ. Oxalis.
17. Malvaceæ. Malva.
Althæa.
Hibiscus.
Theobroma.
18. Tiliaceæ. Tilia.
19. Cistoideæ. Cistus.
Viola.
20. Rutaceæ. Guaiacum.
Ruta.
Dictamnus.
21. Caryophylleæ.
Dianthus.
Linum.

Cl. XIV. PERIGYNIA.

Ord. 1. Portulaceæ.
2. Ficoideæ.
3. Succulentæ. Sedum.
4. Saxifrageæ. Ribes.
5. Cactoideæ. Cactus.
6. Melastomeæ.
7. Calycanthemæ.
8. Epilobianæ.
9. Myrtoideæ.
Eucalyptus.
Melaleuca.
Myrtus.
Eugenia.
Caryophyllus.
Punica.
10. Rosaceæ. Malus.
Pyrus.
Cydonia.
Rosa.
Alchemilla.
Tormentilla.
Potentilla.
Geum.
Rubus.
Cerasus.
Prunus.
Amygdalus.

Ord. 11. LEGUMINOSÆ.
Mimosa.
Tamarindus.
Cassia.
Moringa.
Hæmatoxylum.
Spartium.
Genista.
Trigonella.
Lupinus.
Melilotus.
Dolichos.
Astragalus.
Glycyrrhiza.
Dalbergia.
Geoffræa.
Pterocarpus.
Copaifera.

12. TEREBINTACEÆ.
Rhus.
Amyris.
Terebinthus.
Bursera.
Toluifera.
Fagara.
Juglans.

13. RHAMNOIDEÆ.
Rhamnus.

*D. APETALI.*

Cl. XV. IDIOGYNIA.

Ord. 1. TITHYMALOIDEÆ.
Euphorbia.
Clutia.
Ricinus.
Croton.

2. CUCURBITACEÆ.
Bryonia.
Elaterium.
Momordica.
Cucumis.
Cucurbita.

3. URTICEÆ. Ficus.
Dorstenia.
Urtica.
Parietaria.
Humulus.
Piper.
Morus.

4. AMENTACEÆ. Ulmus.
Salix.
Populus.
Betula.
Quercus.
Liquidamber.

5. CONIFERÆ. Juniperus.
Abies.
Pinus.

## No. IV.

*List of Substances belonging to the* Mineral Kingdom, *which are used in Medicine.*

### EARTHS.

#### LIME.

Carbonate of Lime.
*a.* Chalk.
*b.* Marble.

#### BARYTA.

Carbonate of baryta.
Sulphate of baryta.

#### ALUMINA.

Bole.

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### SALTS.

Sulphate of magnesia.
Super-sulphate of alumina and potass.
Sulphate of iron.
of copper.
of zinc.
Sub-borate of soda.
Nitrate of potass.
Muriate of soda.

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### INFLAMMABLES.

Naphtha.
Bitumen.
Amber.
Sulphur.

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### METALS.

Gold.
Silver.
Copper.
Iron.
Tin.
Lead.
Mercury.
Zinc.
Antimony.
Arsenic.
Bismuth.

# PART III.

# PREPARATIONS AND COMPOSITIONS.

## CHAP. I.—SULPHUR.

SULPHUR SUBLIMATUM LOTUM. *Edin.*
*Washed Sublimed Sulphur.*

Take of
Sublimed sulphur, one part;
Water, four parts.
Boil the sulphur for a little in the water, then pour off this water, and wash away all the acid by affusions of cold water; and, lastly, dry the sulphur.

*Dub.*

Let warm water be poured upon sublimed sulphur, and the washing be repeated as long as the water, when poured off, is impregnated with acid, which is known by the test of lithmus. Dry the sulphur on bibulous paper.

SULPHUR LOTUM. *Lond.*
*Washed Sulphur.*

Take of
Sublimed Sulphur, a pound.
Pour on it boiling water, so that the acid, if there be any, may be entirely washed away; then dry.

As it is impossible to sublime sulphur in vessels perfectly void of air, a small portion of it is always acidified and converted into sulphurous or sulphuric acid. The presence of acid in sulphur is always to be considered as an impurity, and must be removed by careful ablution. Sulphur is directed to be kept in closed vessels; and Dr Powell says, that in an open drawer, its superior surface becomes manifestly acid on long

keeping; but when thoroughly washed, sublimed sulphur is not acted upon by the atmosphere; there is therefore no particular reason for preserving it from the action of the air; for if, on keeping, it become moist, it is because the sulphuric acid has not been entirely washed away.

### SULPHUR PRÆCIPITATUM. *Lond.*
### *Precipitated Sulphur.*

Take of
 Sublimed sulphur, one pound;
 Fresh lime, two pounds.
 Water four gallons.

Boil the sulphur and lime together in the water, then filter the liquor through paper, and drop into it as much muriatic acid as may be necessary to precipitate the sulphur. Lastly, wash this by repeatedly pouring upon it water till it becomes insipid.

THIS process is a considerable improvement upon that in the preceding Pharmacopœia, being more economical, in the proportion of 3 to 1. A solution of sulphuret of lime is first prepared; it is then decomposed by muriatic acid, which unites with the lime, expels sulphuretted hydrogen gas, and precipitates the sulphur, which is easily purified by ablution from the very soluble muriate of lime. The quantity of lime, used in forming the sulphuret, though reduced in the edition 1815 from three pounds to two, is still somewhat too large. Mr Phillips found that 10 parts of sulphur dissolve only about 4.5 of lime.

Precipitated sulphur, though much more expensive, does not differ in its medical properties from well-washed sublimed sulphur Its paler colour is owing to its more minute division, or, according to Dr Thomson, to the presence of a little water; but from either circumstance it derives no superiority to compensate for the trouble and disagreeableness of its preparation, unless its whiter colour be considered as an advantage in the preparation of ointments.

### SULPHURETUM POTASSÆ. *Edin.*
### *Sulphuret of Potass.*

Take of
 Subcarbonate of potass, two parts,
 Sublimed sulphur, one part.

Triturate them together, put them into a large coated crucible, fit a cover to it, and having applied live coals cautiously around it, bring the mixture at length to a state of fusion.

Keep the mass in a very close phial.

*Lond.*

Take of

Washed sulphur, one ounce;

Subcarbonate of potass, two ounces.

Triturate them together, and place them in a covered crucible over the fire until they unite.

SULPHURETUM KALI. *Dub.*
*Sulphuret of Kali.*

Take of

Subcarbonate of kali,

Sublimed sulphur, each two ounces.

Mix and put them into a crucible. Fit a cover to it, and expose them to a heat, gradually increased, until they unite.

THERE exists a very strong affinity between sulphur and potass, but they must be united in a state of perfect dryness; because, if any moisture be present, it is decomposed, and alters the nature of the product. If potass be employed, it will unite with the sulphur by simple trituration, and will render one-third of its weight of sulphur soluble in water. If subcarbonate of potass be used, as directed by the colleges, it is necessary to bring the sulphur into a state of fusion; it then acts upon the subcarbonate, and expels the carbonic acid. It is evident, that to saturate the same quantity of sulphur, a larger proportion of subcarbonate of potass than of potass is necessary. The Colleges now agree in using two parts of subcarbonate to one of sulphur. Gottling directs only one part to two of sulphur: and to save the crucible, he directs the mixture, as soon as it melts, to be poured into a heated mould, anointed with oil. If the fusion be not very cautiously performed, the sudden extrication of so large a quantity of carbonic acid gas is apt to throw the melted matter out of the crucible, and may be attended with unpleasant consequences. La Grange projects one part of sulphur upon one and a half of potass in fusion, and keeps the compound melted half an hour before he pours it out. If the heat be too great, and the crucible uncovered, the sulphureous vapour is apt to inflame; but it is easily extinguished by covering it up. For the preparation of precipitated sulphur, Hermbstadt proposes to obtain the sulphuret

of potass, by heating together in a crucible four parts of sulphate of potass with one of charcoal powder. The charcoal is converted into carbonic acid gas, and the sulphate into sulphuret.

Sulphuret of potass, properly prepared, is of a liver brown colour, and was hence formerly called *Hepar sulphuris*. It should be hard, brittle, and have a vitreous fracture. It has an acrid bitter taste, and the smell of sulphur. It is exceedingly prone to decomposition. It is deliquescent in the air, and is decomposed. It is very fusible, but a strong heat separates the sulphur by sublimation. The moment it comes in contact with water, there is a mutual decomposition. Part of the sulphur becomes acidified, deriving oxygen from the water, and forms sulphate of potass. Part of the hydrogen of the water decomposed, combines with another portion of the sulphur, and escapes in the form of sulphuretted hydrogen gas: another portion of the hydrogen combines with a third portion of the sulphur, and remains in solution, united with the alkali, in the state of hydroguretted sulphuret of potass. By acids, sulphuret of potass is immediately decomposed; the acid combines with the potass, sulphuretted hydrogen gas is expelled, and the sulphur is precipitated.

### Aqua sulphureti kali. *Dub.*
### *Water of Sulphuret of Kali.*

Take of

Sublimed sulphur, half an ounce;

Water of caustic kali, nine ounces, by measure.

Boil for ten minutes, and strain through paper. Keep the liquor in phials well corked.

The specific gravity of this liquor is 1120.

The Dublin college have thus, besides the sulphuret of potass, a preparation which is exactly similar to a solution of it in water. When sulphur is boiled in a solution of caustic alkali, a portion of the water is decomposed; the oxygen forms, with some of the sulphur and potass, sulphate of potass, and the hydrogen, with the remainder, hydro-sulphuret of potass. The former being difficultly soluble, is precipitated and separated by filtration. The solution must be well preserved from the action of the air, which gradually decomposes it, forming sulphate of potass.

*Medical use.*—Hydro-sulphuret of potass is an exceedingly nauseous remedy; but it is used internally as an antidote to metallic poisons, to check excessive salivations from mercury, and in cutaneous affections. Externally, it is used against tinea capitis, and in psora. I have long been in the

habit of using with success in the scabies and psoriasis of infants, a bath prepared by dissolving sulphuret of potass in water.

### SULPHURETUM FERRI. *Ed.*
*Sulphuret of Iron.*

Take of
Purified filings of iron, three parts,
Sublimed sulphur, one part,
Mix and expose them to a moderate degree of heat, in a covered crucible, until they unite into a mass.

*Dub.*

Take of
Filings of iron, six ounces;
Sublimed sulphur, two ounces.
Mix and expose them in a covered crucible to a gentle heat until they unite.

THE sulphuret of iron is only used in pharmacy for the preparation of hydro-sulphuret of ammonia. Proust has proved that iron is capable of combining with two proportions of sulphur. At a high temperature, 100 parts of iron combine with 60 of sulphur, and form a compound of a dull blackish colour. In this state, it is fit for the production of sulphuretted hydrogen gas. At a lower temperature, the same quantity of iron takes up 90 of sulphur, acquires a greenish-yellow colour, and in every respect resembles native pyrites. This cannot be decomposed by acids, and is therefore unfit for the production of gas; but it may be reduced to the state of iron sulphuretted to the minimum, by exposing it to a sufficiently high temperature, or by melting it with half its weight of iron-filings. It was probably from not attending to the different states of sulphuretted iron, that some of the German chemists failed in their attempts to procure from it sulphuretted hydrogen gas, and had recourse to sulphuret of potass.

### HYDRO-SULPHURETUM AMMONIÆ. *Ed.*
*Hydro-Sulphuret of Ammonia.*

Take of
Water of ammonia,
Sulphuret of iron, of each four ounces,
Muriatic acid, eight ounces,
Water, two pounds and a half.
Pour the acid, previously mixed with the water, on the sulphuret, and pass the gas extricated from them through the water of ammonia. Keep the liquor in very close phials.

### HYDRO-SULPHURETUM AMMONIÆ. *Dub.*
### *Hydro-Sulphuret of Ammonia.*

Take of
Sulphuret of iron in coarse powder, four ounces;
Muriatic acid, seven ounces, by measure;
Water, two pints;
Water of caustic ammonia, four ounces.

Put the sulphuret into a matrass, then gradually pour on the acid diluted with the water, and in a proper apparatus transmit the gass evolved, through the water of ammonia. Towards the end of the operation apply a gentle heat to the matrass.

SULPHURETTED hydrogen is capable of combining with different bases in the manner of an acid. In the present preparation, it is combined with ammonia, and is obtained by decomposing sulphuret of iron by muriatic acid. As soon as the acid, by its superior affinity, separates the iron from the sulphur, the latter immediately re-acts on the water, the oxygen of which forms, with one portion of it, sulphuric acid, while the hydrogen dissolves another portion, and forms sulphuretted hydrogen gas. The combination of this with ammonia is facilitated by reduction of temperature, and by making it pass through a column of the water of ammonia, by means of an apparatus, such as Woulfe's, or Nooth's. The ammonia very readily assumes a greenish yellow colour, from the absorption of the sulphuretted hydrogen.

Trommsdorff has proposed, that the sulphuretted hydrogen gas should be obtained by the decomposition of sulphuret of potass; but in this way its formation is too rapid to be easily managed. Gottling says, that the acid should be added gradually, and that the whole must be constantly agitated. But these precautions are rendered less necessary, by diluting the acid to the degree directed by the Pharmacopœia. Mr Cruickshank, who first suggested the use of hydro-sulphuret of ammonia in medicine, directs the sulphuret of iron to be prepared by heating a bar of iron to a white heat in a smith's forge, and rubbing against the end of it a roll of sulphur. The iron, at this temperature, immediately combines with the sulphur, and forms globules of sulphuretted iron, which should be received in a vessel filled with water. It is, however, more conveniently obtained in the manner directed by the colleges.

*Medical use.*— Hydro-sulphuret of ammonia, or, more correctly, sulphuretted hydroguret of ammonia, acts powerfully on the living system. It induces vertigo, drowsiness, nausea, and vomiting, and lessens the action of the heart and arteries. It therefore seems to be a direct sedative. According to the doctrine of the chemical physiologists, it is a powerful disoxy-

genizing remedy. It has only been used in diabetes, by Dr Rollo and others, under the name of Hepatized ammonia, in doses of five or ten drops twice or thrice a-day.

AQUA SULPHURETI AMMONIÆ. *Dub.*
*Water of Sulphuret of Ammonia.*

Take of
Fresh burnt lime,
Muriate of ammonia in powder, each four ounces;
Sublimed sulphur,
Warm water, each two ounces, by weight.

Sprinkle the water upon the lime, placed in an earthen vessel, and cover it up until the lime falls to powder, which, as soon as it is cold, is to be mixed by trituration with the sulphur and muriate of ammonia. Put the mixture into a retort, and distil with a sudden and sufficiently strong degree of heat. Keep the liquor thus obtained in a phial, accurately closed with a glass stopper.

The second process of the Dublin college is totally different. The ammonia and sulphuretted hydrogen are presented to each other in a nascent state, and with the undecomposed part of the water pass over into the receiver, while, in the retort, the lime remains combined with sulphuric and muriatic acid.

The hydro-sulphuret of ammonia was formerly called the *fuming liquor of Boyle.* It is of a dark red colour, and is extremely fetid. It differs from the hydro sulphuret of ammonia, prepared by the preceding process, in containing a portion of uncombined alkali, to which, according to Berthollet, its property of emitting fumes is owing, and in the last portions which come over being in the state of a hydroguretted sulphuret. It soon, however, is converted into a hydro-sulphuret, by losing its excess of ammonia and sulphur. It is decomposed by all acids, and almost all metallic solutions.

## CHAP. II.—ACIDS.

ACIDUM SULPHURICUM DILUTUM. *Ed.*
*Diluted Sulphuric Acid.*

Take of
Sulphuric acid, one par

Water, seven parts.
Mix them.

*Dub.*

Take of
Sulphuric acid, two ounces, by weight;
Distilled water, fourteen ounces, by weight.
Having gradually mixed them, set the mixture aside to cool, and then pour off the clear liquor.
The specific gravity of this acid is 1090.

*Lond.*

Take of
Sulphuric acid, one fluidounce and a half;
Distilled water, fourteen fluidounces and a half.
Add the acid by degrees to the water, and mix.

The most simple form in which sulphuric acid can be advantageously employed internally, is that in which it is merely diluted with water: and it is highly proper that there should be some fixed standard, in which the acid in this state should be kept. It is, however, much to be regretted, that the same standard with respect to strength has not been uniformly adopted; and especially that the London college should have deviated so very remarkably, both from their own former editions and from the other colleges. In the Edinburgh and Dublin Pharmacopœias, the strong acid is one-eighth by weight of the mixture, which gives one drachm in the ounce, which has at least the merit of convenience. Dr Powell, whose translation may be considered as official, states, in defence of the change, that the new mixture will be more conveniently made, and that its proportionate dose is easily administered, especially as minute attention thereto is not of any great practical importance. An ounce of sulphuric acid, by measure, is equal to 14 dr and eight-tenths of a grain. The comparative strengths of equal bulks and of equal weights of the diluted acids in the different Pharmacopœias are nearly in the following proportions:

| | Bulks. | Weights. | Sp. gr. |
|---|---|---|---|
| Former London, | 1000 | 1000 | 1.070 |
| Dublin, - | | 1118 | 1.090 |
| Edinburgh, - | | 1125 | |
| New London, - | 1480 | 1445 | 1.111 Ph. |

Dr Powell says, that one ounce of the last will saturate about 107 grains of dried subcarbonate of soda, which is confirmed by Mr Phillips. The dilution by means of distilled water is preferable to spring water; which, even in its purest state, is not free from impregnations affecting the acid. Even when distilled water is used, there is often a small quantity of a white precipitate, arising from lead dissolved in the acid.

Sulphuric acid has a very strong attraction for water: and their bulk, when combined, is less than that of the water and acid separately. At the same time, there is a very considerable increase of temperature produced, which is apt to crack glass vessels, unless the combination be very cautiously made; and, for the same reason, the acid must be poured into the water, not the water into the acid. Sulphuric acid, according to Powell, diluted with an equal measure of water, and allowed to cool, rose 21° on the addition of another measure, and 7° after cooling again on the addition of a third.

*Table of the Quantity of Real Acid in* 100 *parts of Liquid Sulphuric Acid, at the temperature* 60°. *Dalton.*

| *Atoms.* Acid. Water. | *Acid per cent. by weight.* | *Acid per cent. by measure.* | *Specific gravity.* | *Boiling point.* |
|---|---|---|---|---|
| 1 + 0 | 100 | unknown. | unknown. | |
| 1 + 1 | 81 | 150 | 1.850 | 620° |
| | 80 | 148 | 1.849 | 605 |
| | 79 | 146 | 1.848 | 590 |
| | 78 | 144 | 1.847 | 575 |
| | 77 | 142 | 1.845 | 560 |
| | 76 | 140 | 1.842 | 545 |
| | 75 | 138 | 1.838 | 530 |
| | 74 | 135 | 1.833 | 515 |
| | 73 | 133 | 1.827 | 501 |
| | 72 | 131 | 1.819 | 487 |
| | 71 | 129 | 1.810 | 473 |
| | 70 | 126 | 1.801 | 460 |
| | 69 | 124 | 1.791 | 447 |
| 1 + 2 | 68 | 121 | 1.780 | 435 |
| | 67 | 118 | 1.769 | 422 |
| | 66 | 116 | 1.757 | 410 |
| | 65 | 113 | 1.744 | 400 |
| | 64 | 111 | 1.730 | 391 |
| | 63 | 108 | 1.715 | 382 |
| | 62 | 105 | 1.699 | 374 |
| | 61 | 103 | 1.684 | 367 |
| | 60 | 100 | 1.670 | 360 |
| 1 + 3 | 58.6 | 97 | 1.650 | 350 |
| | 50 | 76 | 1.520 | 290 |
| | 40 | 56 | 1.408 | 260 |
| 1 + 10 | 30 | 39 | 1.30+ | 240 |
| 1 + 17 | 20 | 24 | 1.200 | 224 |
| 1 + 38 | 10 | 11 | 1.10 | 218 |

*Med. use.*—Diluted sulphuric acid is an excellent tonic, checking fermentation, exciting appetite, promoting digestion, and quenching thirst, and it is therefore used with success in morbid acidity, weakness, and relaxation of the stomach. As an astringent, it is used in hæmorrhagies; and from its refrigerant and antiseptic properties, it is a valuable medicine, in many febrile diseases, especially those called putrid. If taken in any considerable quantity, or for some time, it seems to pass off undecomposed by the kidneys or skin; and it is perhaps by its stimulant action on the latter, that it is advangeously employed internally in scabies, and other cutaneous affections. The best mode of prescribing it, is to order the quantity of acid to be used, and to direct it to be mixed with as much water as will render it palatable, to which some syrup or mucilage may be added. To prevent it from attacking the teeth, it may be conveniently sucked through a quill, and the mouth should be carefully washed after each dose.

Externally it is used as a gargle, particularly in putrid sore throats, and in aphthous mouths, and as a wash in cutaneous eruptions, and ill-conditioned ulcers. Made into an ointment with sixteen times its weight of axunge, it has been used to cure psora.

### ACIDUM NITROSUM. *Ed.*
### *Nitrous Acid.*

Take of
Nitrate of potass, bruised, two pounds;
Sulphuric acid, sixteen ounces.

Having put the nitrate of potass into a glass retort, pour upon it the sulphuric acid, and distil in a sand-bath with a heat gradually increased, until the iron-pot begins to be red-hot.

The specific gravity of this acid is to that of distilled water as 1520 to 1000.

### *Dub.*

Take of
Nitrate of kali, six pounds;
Sulphuric acid, four pounds.

Mix and distil, until the residuum becomes dry.

The specific gravity of this acid is 1500.

### ACIDUM NITRICUM. *Ed.*
### *Nitric Acid.*

Take of
Nitrous acid, any quantity.

Put it into a glass retort, and having adapted a cold receiver, apply a very gentle heat, until the reddest portion shall have passed over, and the acid which remains in the retort, when almost deprived of colour, shall have become nitric acid.

*Lond.*

Take of
Nitrate of potass dried,
Sulphuric acid, each two pounds by weight.

Mix in a glass retort, and by means of a sand-bath distil off the nitric acid until red fumes appear. Then re-distil the acid in the same manner, having previously added another ounce of dried nitrate of potass.

The specific gravity of nitric acid is 1.5. If a piece of limestone be put into a fluidounce of it, diluted with water, one ounce should be dissolved.

In this process, the sulphuric acid, by its superior affinity, combines with the potass of the nitre, to form sulphate of potass, while the nitric acid is separated, and is converted into vapour, by the application of the heat to the retort, and is condensed in the receiver.

In performing this process, we must take care, in pouring in the sulphuric acid, not to soil the neck of the retort. Instead of a common receiver, it is of advantage to use some modification of Woulfe's apparatus; and as the vapours are extremely corrosive, the fat lute must be used to connect the retort with it. The London college, intending that the product should be *nitric* acid, direct us to continue the process only until red fumes appear; but there are red fumes from the very first. Mr Stocker says, that by careful distillation, the London process affords nine ounces of straw-coloured nitric acid, sp. gr. 1.5404; after which the fumes become deeper red, and the product darker, inclining to orange; but the total product is but slightly coloured, amounts to ten or eleven ounces, and has the sp. gr. required. The London college formerly used no more sulphuric acid than what was necessary to expel all the nitric acid, and the residuum was a neutral sulphate of potass, so insoluble, that it could not be got out without breaking the retort. The Edinburgh and Dublin colleges order as much sulphuric acid as renders the residuum an acidulous sulphate of potass, easily soluble in water, and the London college now employ a still larger quantity. The manufacturers of nitrous acid use *rough nitre* with one half its weight of sulphuric acid.

Nitrous acid is frequently impure. The presence of sulphuric acid is detected by nitrate of barytes; but before applying this test, the acid must be diluted, as otherwise the salt itself is precipitated in consequence of the acid attracting the water in which it is dissolved. Sulphuric acid is easily got rid of by re-distilling the nitrous acid from a small quantity of nitrate of potass, and this rectification forms part of the new London process; as, from the large proportion of sulphuric acid used by them, they seem to have anticipated this contamination, which however does not take place, not even, according to Mr Stocker, when the distillation is continued, until the saline mass is brought into a state of fusion.

Muriatic acid is detected by the precipitate formed with nitrate of silver, and may be separated by dropping into the nitrous acid a solution of nitrate of silver, as long as it forms any precipitate, and drawing off the nitrous acid by distillation.

Sir H. Davy has shewn, that nitrous acid is a compound of nitric acid and nitric oxide; and that, by additional doses of the last constituent, its colour is successively changed from yellow to orange, olive green, and blue green, and its specific gravity is diminished. As commonly prepared, the acid is more or less high coloured, and emits red fumes; whereas pure nitric acid emits only white fumes. Hence the Edinburgh college have given a process for converting nitrous into nitric acid, which Dr Powell thinks uneconomical, as not only nitrous gas, but a large proportion of the acid itself, passes to waste.

By the application of a gentle heat, the whole of the nitric oxide is vaporized, and pure colourless nitric acid remains in the retort. The nitric oxide, however, carries over with it a portion of the acid, and condenses with it in the receiver, in the form of a very high-coloured nitrous acid.

Richter has given the following process for preparing nitric acid.

Take of

Purified nitrate of potass, seven pounds;

Black oxide of manganese, one pound, two ounces;

Sulphuric acid, four pounds, four ounces, and six drachms.

Into a retort capable of containing twenty-four pounds, introduce the nitre and manganese, powdered and mixed, and pour upon them gradually, through a retort funnel, the sulphuric acid. Lute on the receiver with flour and water, and conduct the distillation with a gradually increased heat.

From these proportions, Richter got three pounds nine ounces of very slightly coloured nitric acid. The operation will be conducted with less hazard in a Woulfe's apparatus, or by interposing between the retort and receiver a tubulated adopter, furnished with a bent tube, of which the further extremity is immersed in a vessel containing a small quantity of water.

The specific gravity of nitrous acid was formerly stated too high by the Edinburgh college; for, although Rouelle makes that of the strongest nitric acid 1.583, yet Kirwan could produce it no stronger at 60 than 1.5543. Sir H. Davy makes it only 1.504, and when saturated with nitric oxide, only 1.175; and Mr Phillips says it varies from 1.509 to 1.519. The present statement of the Edinburgh college is from very accurate experiments.

### Acidum nitrosum dilutum. *Ed.*
*Diluted Nitrous Acid.*

Take of
  Nitrous acid,
  Water, equal weights.
Mix them, taking care to avoid the noxious vapours.

*Dub.*

Take of
  Nitrous acid,
  Distilled water, each one pound.
Mix.
  The specific gravity is 1280.

### Acidum nitricum dilutum. *Lond.*
*Diluted Nitric Acid.*

Take of
  Nitric acid, one fluidounce;
  Distilled water, nine fluidounces.
Mix.

Nitrous acid has a great affinity for water, and attracts it from the atmosphere. During their combination there is an increase of temperature, part of the nitric oxide is dissipated in the form of noxious vapours, and the colour changes successively from orange to green, and to blue, according as the proportion of water is increased. A mixture of equal parts of Kirwan's standard acid of 1.5543 and water, has the specific gravity 1.1911. The diluted acid of the London pharmacopœia is about 1.08.

In fact, one ounce of nitric acid, by measure, is equal to one ounce, three drachms, 21.75 grains, by weight; and one liquid ounce saturates about 48 grains of white marble. The strength of the diluted nitric acid of the former London Pharmacopœia is to that of the present as 4 to 1.

*Table of the Quantity of Real Acid in* 100 *parts of Liquid Nitric Acid at* 6°. *Dalton.*

| Atoms. Acid. | | Water. | Acid per cent. by weight. | Acid per cent. by measure. | Specific gravity. | Boiling point. |
|---|---|---|---|---|---|---|
| 1 | + | 0 | 100 | 175? | 1.75? | 30°? |
| 2 | + | 1 | 82.7 | 134 | 1.62 | 100? |
| 1 | + | 1 | 72.5 | 112 | 1.54 | 175 |
| | | | 68 | 102 | 1.50 | 210 |
| | | | 58.4 | 84.7 | 1.45 | 240 |
| 1 | + | 2 | 54.4 | 77.2 | 1.42 | 248 |
| | | | 51.2 | 71.7 | 1.40 | 247 |
| 1 | + | 3 | 44.3 | 59.8 | 1.35 | 242 |
| 1 | + | 4 | 37.4 | 48.6 | 1.30 | 236 |
| 1 | + | 5 | 32.3 | 40.7 | 1.26 | 232 |
| 1 | + | 6 | 28.5 | 34.8 | 1.22 | 229 |
| 1 | + | 7 | 25.4 | 30.5 | 1.20 | 226 |
| 1 | + | 8 | 23 | 27.1 | 1.18 | 223 |
| 1 | + | 9 | 21 | 24.6 | 1.17 | 221 |
| 1 | + | 10 | 19.3 | 22.4 | 1.16 | 220 |
| 1 | + | 11 | 17.8 | 20.5 | 1.15 | 219 |
| 1 | + | 12 | 16.6 | 18.9 | 1.14 | 219 |

These acids, the nitrous and nitric, have been long employed as powerful pharmaceutic agents. Their application in this way I shall have many opportunities of illustrating.

*Medical use.*—Lately, however, their use in medicine has been considerably extended. In the state of vapour they have been used to destroy contagion in gaols, hospitals, ships, and other places where the accumulation of animal effluvia is not easily avoided. The fumigating such places with the vapour of nitrous acid has certainly been attended with success; but we have heard that success ascribed entirely to the ventilation employed at the same time. Ventilation may unquestionably be carried so far, that the contagious miasmata may be diluted to such a degree that they shall not act on the body; but to us it appears no less certain, that these miasmata cannot come in contact with nitric acid or oxymuriatic acid vapour, without being entirely decomposed and completely destroyed. Fumigation is, besides, applicable in situations which do not admit of sufficient ventilation; and where it is, the previous diffusion of acid vapours is an excellent check upon the indolence and inattention of servants and nurses, as by the smell we are enabled to judge whether they have been sufficiently

attentive to the succeeding ventilation. Nitric acid vapour, also, is not deleterious to life, and may be diffused in the apartments of the sick, without occasioning to them any material inconvenience. The means of diffusing it are easy. Half an ounce of powdered nitre is put into a saucer, which is placed in a pipkin of heated sand. On the nitre two drachms of sulphuric acid are then poured. The fumes of nitric acid immediately begin to rise. This quantity will fill with vapour a cube of ten feet; and by employing a sufficient number of pipkins, the fumes may be easily made to fill a ward of any extent. For introducing this practice, Dr Carmichael Smyth received from the British Parliament a reward of five thousand pounds.

The internal use of these acids has also been lately much extended. In febrile diseases, water acidulated with them forms one of the best antiphlogistic and antiseptic drinks we are acquainted with. Hoffman and Eberhard long ago employed it with very great success in malignant and petechial fevers; and in the low typhus, which frequently rages among the poor in the suburbs of Edinburgh, I have repeatedly given it with unequivocable advantage. In the liver complaint of the East Indies, and in syphilis, nitric acid has also been extolled as a valuable remedy by Dr Scott, and the evident benefits resulting from its use in these complaints has given rise to a theory, that mercury only acts by oxygenizing the system It is certain that both the primary and secondary symptoms of syphilis have been removed by the use of these acids, and that the former symptoms have not returned, or been followed by any secondary symptoms. But in many instances they have failed; and it is doubtful if ever they effected a permanent cure, after the secondary symptoms appeared. Upon the whole, the opinions of Mr Pearson on this subject, lately agitated with so much keenness, appear to us so candid and judicious, that we shall insert them here. He does not think it eligible to rely on the nitrous acid in the treatment of any one form of the lues venerea; at the same time, he by no means wishes to see it exploded as a medicine altogether useless in that disease. When an impaired state of the constitution renders the introduction of mercury into the system inconvenient, or evidently improper, the nitrous acid will be found, he thinks, capable of restraining the progress of the disease, while, at the same time, it will improve the health and strength of the patient. On some occasions, this acid may be given in conjunction with a mercurial course, and it will be found to support the tone of the stomach, to determine powerfully to

the kidneys, and to counteract, in no inconsiderable degree, the effects of mercury on the mouth and fauces.

ACIDUM MURIATICUM. *Ed.*
*Muriatic Acid.*

Take of
Muriate of soda, previously heated to redness,
Sulphuric acid,
Water, of each two pounds.

Mix the acid with eight ounces of the water, and when the mixture has cooled pour it on the muriate of soda in a glass retort. Then having fitted on a receiver containing the rest of the water, distil in a sand-bath, with a gentle heat. In a short time lute the vessels together, and distil to dryness.

The specific gravity of this muriatic acid is to that of distilled water as 1170 to 1000.

*Lond.*

Take of
Dried muriate of soda, two pounds;
Sulphuric acid, by weight, twenty ounces;
Distilled water, a pint and a half.

First mix the acid with half a pint of the water in a glass-retort, and add to the mixture, after it has cooled, the muriate of soda. Pour the rest of the water into the receiver; then having fitted on the retort, distil the muriatic acid over into this water, with the heat of a sand bath gradually increased until the retort become red.

The specific gravity of this acid is to that of distilled water as 1160 to 1000.

If a piece of limestone be put into a fluidounce of this acid diluted with water, 220 grains should be dissolved.

*Dub.*

Take of
Muriate of soda, dried,
Sulphuric acid,
Water, each six pounds.

Add the acid, diluted with the water, after the mixture has cooled, gradually to the salt, in a glass retort, and then distil the liquor, until the residuum become dry.

The specific gravity of this acid is 1170.

In this process the muriate of soda is decomposed, and the muriatic acid disengaged by the superior affinity of the sul-

phuric acid. But as muriatic acid is a permanently elastic fluid, the addition of the water is absolutely necessary for its existence in a fluid form. The London and Edinburgh Colleges put a portion of water into the receiver, for the purpose of absorbing the muriatic acid gas, which is first disengaged, and which would otherwise be lost for want of water to condense it: the Dublin College, however, orders the whole of the water to be previously mixed with the sulphuric acid; and it is indispensably necessary that the mixture of acid and water be allowed to cool before it be added to the salt; for the heat produced is so great, that it would not only endanger the breaking of the retort, but occasion considerable loss and inconvenience, by the sudden disengagement of muriatic acid gas. Dr Powell thinks it is an improvement to add the salt to the diluted acid, but it is less convenient.

Mr Phillips has given us a tabular view of the results of the processes of the London pharmacopœias, 1809 and 1787, and of a modification of the latter.

| | Mur. soda. | Sulph. acid. | Water. | Cost. | Product. | Sp. gr. | Marble decomp. |
|---|---|---|---|---|---|---|---|
| 1787 | 35 | 21 | 17.5 | 56 | 29.75 | 1.188 | 15.09 |
| Modif. | 35 | 21 | 22. | 56 | 35. | 1.174 | 16.43 |
| 1809 | 32 | 24 | 39.4 | 56 | 43.68 | 1.142 | 17.16 |

It may be observed, that according to these experiments, the new process does not produce an acid nearly of the strength ordered by the college, its specific gravity being 1.142 instead of 1.160, and the fluidounce decomposing only 204 instead of 220 grains of marble, while muriatic acid from Apothecaries Hall is of specific gravity 1.158. The difference of strength from the statement in the edition 1809 was greater, as the sp. gr. was said to be 1.170, and the solvent power 240; it may now be accounted for by some variation in the manipulation, especially as Dr Powell quotes the present statement as the result of experiment. At any rate, the new process is more economical, as at a given expence it produces a greater solvent power.

The muriate of soda, which should be of the kind called Bay Salt, is directed by Dublin and Edinburgh to be heated to redness, before it be introduced into the retort, that the whole of the water of crystallization may be expelled, which being variable in quantity, would otherwise affect the strength of the acid produced; and besides, without this precaution, the acid obtained is too high coloured. The London college use the salt dried, but not decrepitated.

The charge should not occupy more than half the body of the retort; and if a common retort and receiver be employed for this distillation, they must not be luted perfectly closely; for if any portion of the gas should not be absorbed by the water employed, it must be allowed to escape; but the process will be performed with greater economy, and perfect safety, in a Woulfe's, or some similar apparatus. The muriatic acid gas, on its condensation, gives out, according to Dr Powell, a considerable heat, so that it is necessary to keep the receiver cooled during the process.

The residuum in the retort consists principally of sulphate of soda, which may be purified by solution and crystallization; and to save the retort, Dr Powell directs it to be filled with boiling water, after the process is over, and it has cooled down to 212°.

If properly prepared, the muriatic acid is perfectly colourless, and possesses the other properties already enumerated; but in the shops, it is very seldom found pure. It almost always contains iron, and very frequently sulphuric acid or copper. The copper is detected by the blue colour produced by super-saturating the acid with ammonia, the iron by the black or blue precipitate formed with tincture of galls or prussiate of potass. The sulphuric acid may be easily got rid of by redistilling the acid from a small quantity of dried muriate of soda. But Mr Hume discovered, that muriate of baryta is precipitated when poured into pure muriatic acid, from the acid attracting the water of the salt.

*Medical use.*—In its effects on the animal economy, and the mode of its employment, it coincides with the acids already mentioned, which almost proves that they do not act by oxygenizing the system. On the contrary, according to Sir H. Davy's view of its constitution, it contains no oxygen, and can only act *chemically* by imparting chlorine or hydrogen to the system, or withdrawing from it oxygen or some other principle which has an affinity for chlorine or hydrogen.

### ACIDUM MURIATICUM DILUTUM. *Dub.*
### *Diluted Muriatic Acid.*

Take of

Muriatic acid,

Distilled water, each one pound. Mix.

The specific gravity is 1080.

THIS diluted acid, of a fixed strength, is convenient for apportioning its dose; and as it is now introduced by the Dublin college, it is to be hoped that the same proportions will be adhered to by the others.

*Table of the quantity of real Acid in 100 parts of Liquid Muriatic Acid, at the Temperature of 60°. Dalton.*

| Atoms. Acid. + Water. | Acid per cent. by weight. | Acid per cent. by measure. | Specific Gravity. | Boiling point. 60° |
|---|---|---|---|---|
| 1 + 1 | 73.3 | | | |
| 1 + 2 | 57.9 | | | |
| 1 + 3 | 47.8 | 71.7 ? | 1.50 | |
| 1 + 4 | 40.7 | | | |
| 1 + 5 | 35.5 | | | |
| 1 + 6 | 31.4 | | | |
| 1 + 7 | 28.2 | | | |
| 1 + 8 | 25.6 | 30.5 | 1.199 | 120 |
| 1 + 9 | 23.4 | 27.5 | 1.181 | 145 |
| 1 + 10 | 21.6 | 25.2 | 1.166 | 170 |
| 1 + 11 | 20.0 | 23.1 | 1.154 | 190 |
| 1 + 12 | 18.7 | 21.4 | 1.144 | 212 |
| 1 + 13 | 17.5 | 19.9 | 1.136 | 217 |
| 1 + 14 | 16.4 | 18.5 | 1.127 | 222 |
| 1 + 15 | 15.5 | 17.4 | 1.121 | 228 |
| 1 + 20 | 12.1 | 13 2 | 1.094 | 232 |
| 1 + 25 | 9.91 | 10.65 | 1.075 | 228 |
| 1 + 30 | 8.40 | 8.93 | 1.064 | 225 |
| 1 + 40 | 6.49 | 6.78 | 1.047 | 222 |
| 1 + 50 | 5.21 | 5.39 | 1.035 | 219 |
| 1 + 100 | 2.65 | 2.70 | 1.018 | 216 |
| 1 + 200 | 1.36 | 1.37 | 1.009 | 214 |

*Table of the quantity of Muriatic Acid Gas in solutions of different Specific Gravities. Sir H. Davy.*

| At temperature 45° Fahrenheit. Barometer 30. 100 parts of solution of muriatic acid gas in water, of spec. gravity | | Of muriatic acid gas, parts | At temperature 45° Fahrenheit. Barometer 30. 100 parts of solution of muriatic acid gas in water, of spec. gravity | | Of muriatic acid gas, parts |
|---|---|---|---|---|---|
| 1.21 | Contain | 42.43 | 1.10 | Contain | 20.20 |
| 1.20 * | | 40.80 | 1.09 | | 18.18 |
| 1.19 | | 38.38 | 1.08 | | 16.16 |
| 1.18 | | 36.36 | 1.07 | | 14.14 |
| 1.17 | | 34.34 | 1 06 | | 12.12 |
| 1.16 | | 32.32 | 1.05 | | 10.10 |
| 1.15 | | 30.30 | 1.04 | | 8.08 |
| 1.14 | | 28.28 | 1.03 | | 6.06 |
| 1.13 | | 26.26 | 1.02 | | 4.04 |
| 1.12 | | 24.24 | 1.01 | | 2.02 |
| 1.11 * | | 22.3 | | | |

AQUA ALCALINA OXYMURIATICA. *Dub.*
*Oxymuriatic Alkaline Water.*

Take of
Dried muriate of soda, two pounds;
Manganese, in powder, one pound;
Water,
Sulphuric acid, each two pounds.

Mix the muriate of soda and manganese: put them into a matrass, and pour on the water. Then, by means of a proper apparatus, add the sulphuric acid gradually, and at different times, and pass the gas thus extricated through a solution of four ounces of carbonate of kali, in twenty-nine ounces, by measure, of water. Towards the end of the operation, heat the matrass moderately.

The specific gravity is 1087.

THIS is commonly considered as a solution of the oxygenated muriate of potass; the oxymuriatic acid is disengaged in the matrass, by the action of the sulphuric acid on the muriate of soda, and black oxide of manganese, which latter furnishes the additional dose of oxygen to the muriatic acid disengaged from the former; and the oxymuriatic acid gas thus formed readily combines with the potass of the solution of the alkaline salt, through which it is made to pass while the carbonic acid is expelled.

But according to Sir Humphry Davy, this is a combination of chlorine with potass: the hydrogen of the muriatic acid in the muriate of soda combining with the oxygen of the black oxide of manganese, the chlorine is set at liberty, and combines with the potass dissolved in the water through which it is made to pass.

Oxymuriate of potass in solution was some years ago strongly recommended as an antisyphilitic remedy, and its use was extended to other cutaneous diseases, and finally to fever and spasmodic diseases, as a general stimulant. It was given in the dose of from three to ten grains, four times a-day, gradually increasing to 25 or 30. At the time, many singular cures performed by means of it were recorded, but it has fallen into disuse, and we do not now hear of its employment; although its introduction so lately into the Dublin Pharmacopœia would lead us to presume that it is still used in Ireland. It sometimes acted as a diuretic, always as a stimulant; and it is singular, that in some cases, in which it produced little or no effect, it passed off undecomposed in the urine. In these cases Mr Cruickshank proposed to remedy the de-

fect, by giving, after each dose, 10 or 15 drops of muriatic acid.

AQUA OXYMURIATICA. *Dub.*
*Oxymuriatic Water,*

Is prepared by transmitting, in a proper apparatus, the superfluous gas of the preceding process (the process for preparing *aqua alcalina oxymuriatica)* through a pint of water. The specific gravity is 1003.

THE oxygenated muriatic acid was also, when the chemical pathology was fashionable, recommended as an antisyphilitic remedy, and it certainly seemed, in some instances, to effect cures; but it has since been laid aside. Mr Braithwaite also recommended it strongly in scarlatina. He gave, according to the age of the patient, from half a drachm to a drachm, in the course of the day, mixed with eight ounces of distilled water; but it is advisable to keep it divided into doses, in different phials, as it loses every time the phial is opened, and it should be kept in a dark place. Dr Willan confirms its use in cynanche maligna.

The vapours of this powerfully decomposing acid have been recommended by Morveau as the best means of destroying contagion; and when properly managed they are more easily borne than the fumes of the muriatic or nitrous acids. They are easily disengaged by mixing together ten parts of muriate of soda, and two parts of black oxide of manganese in powder, and pouring upon the mixture, first four parts of water, and then six parts of sulphuric acid. Fumes of oxygenized muriatic acid are immediately disengaged.

Morveau has since contrived what he calls Dis-infecting or Preservative phials. If intended to be portable, 46 grains of black oxide of manganese, in coarse powder, are to be put into a strong glass phial, of about $2\frac{1}{3}$ cubic inches capacity, with an accurately ground stopper, to which must be added about $\frac{45}{100}$ of a cubic inch of nitric acid of 1.4 specific gravity, and an equal bulk of muriatic acid of 1.134; the stopper is then to be replaced, and the whole secured by inclosing the phial in a strong wooden case, with a cap which screws down so as to keep the stopper in its place. They are used by simply opening the phial without approaching it to the nose, and shutting it as soon as the smell of the muriatic gas is perceived. A phial of this kind, if properly prepared, will preserve its power during many years. For small wards, strong bottles, with ground stoppers an inch in diameter, of about 25 or 27 cubic inches of capacity, may be used, with 372 grains of the oxide, and 3,5 inches of each of the acids, and the stopper

kept in its place by leaden weights; or for larger wards, very strong glass jars, about 43 cubic inches in capacity, containing an ounce of the oxide, and 6 inches of each of the acids. These jars are to be covered with a plate of glass, adjusted to them by grinding with emery, and kept in its place by a screw. In no case is the mixture to occupy more than one-third of the vessel.

### ACIDUM ACETICUM TENUE. *Ed.*
### *Weak Acetic Acid.*

Let eight pounds of vinegar be distilled in glass vessels, with a gentle heat. The first pound which comes over in a sand bath, as being too watery, is to be set aside; the next five pounds will be the weak acetic acid. Continue the distillation as long as a colourless acid is obtained. But this last, as being too empyreumatic, and not fit for internal use, is to be mixed with the pound first obtained, and may be employed for many chemical purposes.

### ACETUM DISTILLATUM. *Dub.*
### *Distilled Vinegar.*

Take of

Vinegar, ten pints.

Draw off with a gentle heat, six pints.

Glass vessels are to be employed in this distillation, and the first pint which comes over is to be rejected.

The specific gravity of this acid is 1006.

### ACIDUM ACETICUM. *Lond.*
### *Acetic Acid.*

Take of

Vinegar, a gallon.

Distil off the acetic acid in a sand bath, from a glass retort, into a cooled glass receiver; then having thrown away the first pint, preserve the next six.

VINEGAR, when prepared from vinous liquors by fermentation, besides acetic acid and water, contains mucilage, extractive, super-tartrate of potass, and often citric or malic acid, alcohol, and a peculiar agreeable aroma. These substances, particularly the extractive and super-tartrate of potass, render it apt to spoil, and unfit for pharmaceutic and chemical purposes. By distillation, however, the acetic acid is easily separated from such of these substances as are not volatile, although it still contains some little extractive matter, as is proved by its assuming a brown colour, when saturated with potass. But by distillation it loses its agreeable flavour, and becomes considerably weaker; for the spirit and

water, being rather more volatile than acetic acid, come over first, while the last and strongest portion of the acid cannot be obtained free from empyreuma.

This process may be performed in a common still, but a retort, which should be very large, as the liquor is apt to boil over, is preferable. The best kinds of wine vinegar should be used; and, even with these, if the distillation be carried on to any great length, it is extremely difficult to avoid empyreuma. The best method, however, is, if a retort be used, to place the sand but a little way up its sides, and, when somewhat more than half the liquor has come over, to pour upon the remainder a quantity of fresh vinegar equal to the liquor drawn off. This may be repeated three or four times; the vinegar supplied at each time being previously heated, as the addition of cold liquor would not only prolong the operation, but also endanger the breaking of the retort. Lowitz recommends the addition of half an ounce of recently burnt and powdered charcoal to each pound of vinegar in the still, as the best means of avoiding empyreuma.

If the common still be employed, it should likewise be occasionally supplied with fresh vinegar, in proportion as the acid runs off, and this continued until the process cannot be conveniently carried farther. The distilled acid must be rectified by a second distillation, in a retort or glass alembic; for, although the head and receiver be of glass or stoneware, the acid will contract a metallic taint from the pewter worm.

The residuum of this process is commonly thrown away as useless. If mixed with about three times its weight of fine dry sand, and committed to distillation in a retort, with a well-regulated fire, it yields an exceedingly strong empyreumatic acid. Besides, it is, without any rectification, better for some purposes, as being stronger than the pure acid; particularly for making acetate of potass or soda; for, in the process for preparing these, the empyreumatic oil is burnt out.

Mr Phillips says, that the best malt vinegar has a specific gravity 1.0204; that the first eighth part which it yields on distillation is of sp. gr. 0.99712, has a decidedly acid taste, and a fluidounce decomposes from 4.5 to 5 grains of precipitated carbonate of lime; while the subsequent six-eighths are of specific gravity 1.0023, and a fluidounce decomposes 8.12 grains of carbonate of lime. Hence he concludes, that it is improvident to reject the first eighth, since it contains about one-twelfth of the acid obtained, and there is no circumstance rendering it necessary to have distilled vinegar either of very equal or very great strength.

Of late distilled acetic acid is prepared at Glasgow as an article of manufactory, and of very considerable strength and

purity, by some means, kept secret, of depriving pyrolignic acid of great part of its empyreuma, so that it is now getting into use even at table; but for this purpose it is certainly inferior, as indeed the best distilled acid is; for although sufficiently sour, it wants that pleasant aroma, which characterizes the best white wine vinegar obtained by fermentation. It answers, however, remarkably well for all chemical and pharmaceutic purposes, as it is procured so strong that it must be diluted with water to reduce it to the strength of distilled vinegar.

Distilled vinegar should be colourless and transparent, specific gravity from 1.007 to 1.0095, have a pungent smell, and purely acid taste, totally free from acrimony and empyreuma, and should be entirely volatile. One fluidounce should dissolve at least 13 grains of white marble, according to Dr Powell. Distilled vinegar should not form a precipitate on the addition of a solution of baryta, or of water saturated with sulphuretted hydrogen; or change its colour when supersaturated with ammonia. These circumstances shew, that it is adulterated with sulphuric acid, or contains lead, copper, or tin.

Distilled acetic acid, in its effects on the animal economy, does not differ from vinegar; and as it is less pleasant to the taste, it is only used for pharmaceutical preparations.

### ACIDUM ACETICUM. *Dub.*
*Acetic Acid.*

Take of
  Acetate of kali, six ounces;
  Sulphuric acid, three ounces, by weight.

Pour the acid into a tubulated retort, and gradually add the acetated kali in different portions, waiting, after every addition, until the mixture cools; then distil off the acid, with a moderate heat, until the residuum become dry.

The specific gravity of this acid is 1070.

### ACIDUM ACETICUM FORTE. *Ed.*
*Strong Acetic Acid.*

Take of
  Sulphate of iron dried, one pound;
  Acetate of lead, ten ounces.

Having rubbed them together, put them into a retort, and distil in a sand-bath, with a moderate heat, as long as any acid comes over.

Many different processes have been proposed for preparing acetic acid, but they may be arranged in three classes. It may be prepared,

1. By decomposing metalline acetates by heat.

2. By decomposing acetates by sulphuric acid.
3. ———————— acetates by sulphates.

The process in the former edition of the London college is an example of the first kind ; but the heat necessary for decomposing verdigris is so great, that it decomposes part of the acetic acid itself, and gives the product an empyreumatic and unpleasant smell.

By the superior affinity of sulphuric acid, the acid may be easily expelled from every acetate, whether alkaline or metallic ; but part of the sulphuric acid seems to be deprived of its oxygen, and to be converted into sulphurous acid, which renders the product impure.

The processes of the last kind are preferable to the others in many respects. They are both more economical, and they furnish a purer acid. Mr Lowitz directs one part of carefully dried acetate of soda to be triturated with three parts of supersulphate of potass, and the distillation to be conducted in a glass retort, with a gentle heat. The Berlin college mix together twelve ounces of sulphate of potass with six of sulphuric acid, diluted with eighteen of water, and evaporate to dryness. With the supersulphate of potass, thus prepared, they decompose nine ounces of acetate of soda, dried with a gentle heat *. The process of the Edinburgh college also belongs to this class, and was first proposed by C. Badollier, apothecary at Chartres.

*Medical use.*—It is almost solely used as an analeptic remedy in syncope, asphyxia, hysteric affections, and headachs. Applied to the skin, it acts as a stimulant and rubefacient, but it is most frequently snuffed up the nostrils in the state of vapour.

### ACIDUM BENZOICUM. *Ed.*
### *Benzoic Acid.*

Take of
 Benzoin, twenty-four ounces ;
 Subcarbonate of soda, eight ounces ;
 Water, sixteen pounds.

Triturate the benzoin with the subcarbonate, then boil in the water for half an hour, with constant agitation, and strain. Boil in the same way the remains of the balsam with other six pounds of water, and strain. Mix these decoctions, and evaporate, until two pounds remain. Filter anew, and drop into the fluid, as long as it produces any precipitation,
 Dilute sulphuric acid.

* The acid residuum of the distillation of nitrous acid would be a very economical substitute.

Dissolve the precipitated benzoic acid in boiling water, strain the boiling solution through linen, and set it aside to crystallize. Wash the crystals obtained with cold water, dry and preserve them.

*Dub.*

Take of

Benzoin, any quantity.

Liquefy it in a retort with a wide throat, having a receiver fitted to it, but not luted, and sublime. Remove the sublimed matter occasionally from the neck of the retort, lest it accumulate in too great a quantity. If it be soiled with oil, press it, folded up in blotting paper, and repeat the sublimation.

*Lond.*

Take of

Benzoin, one pound and a half;
Fresh lime, four ounces;
Water, a gallon and a half;
Muriatic acid, four fluidounces.

Triturate the benzoin with the lime, then boil for half an hour in a gallon of the water, stirring it assiduously with a spatula, and decant the liquor when cold. Boil the residuum again in four pints of water, and decant the liquor as before: then boil down the liquors mixed together to one half; filter through paper, and gradually drop in the muriatic acid, until there be no more precipitate.

Lastly, having poured off the liquor dry the powder with a gentle heat, put it in a proper vessel, placed in a sand bath, and sublime the benzoic acid with a gentle heat.

The distinguishing character of balsams is their containing benzoic acid, which may be separated from the resin, their other principal constituent, either by simple solution in water, sublimation, or by combining it with a salifiable base. The Dublin college directs it to be done in the second way. But, even with the greatest care, it is almost impossible to manage the heat so as not to decompose part of the resin, and thus give rise to the formation of an empyreumatic oil, which contaminates the product. Nor can it be freed completely from the empyreumatic oil by bibulous paper.

The other method of separating benzoic acid from resin was first practised by Scheele, who employed lime water; Göttling afterwards used carbonate of potass; and, lastly, Gren used carbonate of soda, which has been adopted by the

Berlin college, and now by that of Edinburgh. Mr Brande, and he has been followed by the London college, prefers Scheele's process, as the lime dissolves less of the resin of the benzoin than the alkalies do. In experiments which he made for the purpose of ascertaining the comparative value of the different processes, he obtained from one pound of benzoin,

| | Grains. |
|---|---|
| By sublimation, - - - - - | 960 |
| — Scheele's process, - - - | 899 |
| — Gren's and Göttling's process, - | 810 |
| — boiling benzoin in water, - - | 490 |

As the crystallized acid, on account of its lightness and elasticity, is not easily reduced to powder, for most purposes it will be more convenient to keep it in the state of a precipitate.

It may also be extracted from Storax, and all the other balsams, particularly those of Tolu or Peru; and from the urine of children, and of herbivorous animals.

The benzoic acid has an agreeable taste and a fragrant smell, especially when heated. It is soluble in alcohol, and in boiling water, but very sparingly in cold water, although it may be suspended in it, by means of sugar, so as to form an elegant balsamic syrup.

### Acidum citricum. *Lond.*
### *Citric Acid.*

Take of

Lemon juice, one pint;

Prepared chalk, one ounce, or as much as may be required to saturate the juice;

Diluted sulphuric acid, nine fluidounces.

To the lemon juice, heated to ebullition, gradually add the chalk, and mix them. Then decant the liquor, and wash the citrate of lime, which remains behind, in repeated waters. Dry it, and then pour upon the dried powder the diluted sulphuric acid; boil for ten minutes, strain it through a cloth with strong expression, and filter through paper. Evaporate the filtered liquor with a gentle heat, until it form crystals on cooling.

In order to render the crystals pure, they must be dissolved twice, or oftener, in water, filtered each time, evaporated and crystallized.

This process was contrived by Scheele, and was reduced to determinate quantities by Proust, as follows: To 94 parts

of lemon juice, 4 parts of carbonate of lime are to be added; the carbonic acid is separated by effervescence, and a quantity of insoluble citrate of lime is precipitated. By evaporating the supernatant liquor, another portion of citrate of lime is obtained. These added together amount to about 7½ parts, and require 20 parts of sulphuric acid, of the specific gravity of 1.15, to decompose them. The sulphate of lime, being nearly insoluble, is precipitated, while the citric acid remains in solution, and is to be separated by washing, and crystallized by evaporation. If too much sulphuric acid be added, when the liquor is much concentrated, the citric acid is reacted upon, and part of it is charred. In this case a little chalk must be added, to saturate the excess of sulphuric acid. Mr Parker, Tilloch's Journal, vol. xlvi. p. 60, on the authority of a manufacturer of citrate of lime in Sicily, has given some curious details on the subject. 74.964 gallons of lemon juice were used, which, with 35.017 pounds of chalk, gave 49.902 pounds avoirdupoise of citrate. The quantity of citrate produced by every pound of chalk varied from 19 to 27 ounces, and from every gallon of juice from 8¼ to 12½ ounces. This disparity arose from inequality in the acidity of the juice, and from the same quantity of chalk being used with every kind of juice. The chief difficulties of the manufacture consisted in the drying properly the citrate. In some respects this concrete acid is superior, and in others greatly inferior to lemon juice. It has not the flavour; and what is of more consequence, it has not the freshness or antiscorbutic powers of the fruit; but from its solid form and gradual solution it is convenient, and is excellently adapted for effervescing mixtures. Dr Haygarth found that 26 parts of the solid acid saturates 61 of subcarbonate of potash, 42 subcarbonate of ammonia, and 40 of carbonate of magnesia.

The crystals are permanent, and dissolve in three-fourths of their weight of cold, and half their weight of boiling water. Dissolved in eight waters, it is said to be equal in strength to lemon juice.

### OLEUM SUCCINI et ACIDUM SUCCINICUM. *Ed.*
### *Oil of Amber* and *Succinic Acid.*

Take of

Amber reduced to powder, and of pure sand, equal parts.

Mix them, and put them into a glass retort, of which the mixture fills one half; then adapt a large receiver, and distil in a sand bath, with a fire gradually increased. At first, a watery liquor will come over, with a little yellow oil; then

a yellow oil, with an acid salt; and, lastly, a reddish and dark coloured oil. Pour the liquor out of the receiver, and separate the oil from the water.

Press the succinic acid collected from the neck of the retort and sides of the receiver between folds of blotting paper, to free it from the oil adhering to it; then purify it by solution in warm water and crystallization.

ACIDUM SUCCINICUM. *Dub.*
*Succinic Acid.*

Take of
Amber,
Pure sand, each one pound.

Distil, with a heat gradually increased, an acid liquor, an oil, and a salt discoloured with oil. Let the salt be wrapt up in blotting paper, and compressed, to squeeze out the oil, and be again sublimed.

WE are not acquainted with any experiments which determine whether the succinic acid exist as such in the amber, or whether it be a product of the decomposition of the amber by the action of heat; for in the process employed for obtaining succinic acid the amber is completely decomposed.

The sand is added to prevent the amber from running together into masses, and impeding the distillation; but as it renders the residuum unfit for the use of the varnisher, it is not advisable. According to Göttling, this distillation should be performed in a tubulated iron or earthen-ware retort, exposed to the immediate action of the fire; for he says, that in a sand-bath we cannot regulate the heat sufficiently, and that a glass retort is incapable of supporting the necessary temperature.

Besides the succinic acid collected from the neck of the retort, and sides of the receiver, the oil washes down a portion of it into the receiver, and the watery liquor which comes over is saturated with it. But the whole of it may be obtained by agitating the oil with some boiling water, which will dissolve the acid. This solution is then to be added to the acid liquor, and the acid they contain is easily obtained by evaporation and crystallization. The acid may afterwards be purified by solution in boiling water and crystallization, according to the directions of the colleges.

But even after repeated solutions and crystallizations, a portion of empyreumatic oil still adheres to the acid, and renders it impure. Other methods of purifying it have been therefore attempted. Demachy saturated it with lime, sepa-

rated the lime by sulphuric acid, and sublimed the succinic acid: Richter saturated succinic acid with potass, decomposed the salt formed with acetate of lead, and disengaged the succinic acid from the lead by means of diluted sulphuric acid: lastly, Morveau asserts that he obtained it in a state of perfect purity, by treating it with nitrous acid. It is often adulterated with muriate of ammonia, sulphuric acid, sulphate of potass, sugar, &c. When pure it is entirely volatile, gives out no ammoniacal fumes when triturated with potass, is not precipitated by solutions of baryta, and is soluble in alcohol.

Succinic acid, although retained in the Edinburgh and Dublin Pharmacopœias, is never used in medicine. It has been rejected from the London.

## Chap. III.—ALKALIES, and ALKALINE SALTS.

### Aqua potassæ. *Ed.*
*Solution of Potass.*

Take of
 Newly prepared lime, eight ounces;
 Carbonate of potass, six ounces;
 Boiling water, twenty-eight ounces.

Pour upon the lime in an iron or earthen vessel twenty ounces of the water. After the ebullition is finished, instantly add the salt dissolved in eight ounces of the water; and having thoroughly mixed the whole, cover the vessel till they cool. When the mixture has cooled, agitate it well, and pour it into a glass funnel, the throat of which is obstructed with a piece of clean linen. Cover the upper orifice of the funnel, and insert its tube into another glass vessel, so that the Solution of Potass may gradually drop through the rag into the lower vessel. As soon as it ceases to drop, pour into the funnel some ounces of water, but cautiously, so that it may swim above the matter in the funnel. The Solution of Potass will again begin to drop, and the affusion of water is to be repeated in the same manner, until three pounds have dropped, which will happen in the space of two or three days; then mix the superior and inferior parts of the liquor together by agitation, and keep it in a well-stopt phial.

LIQUOR POTASSÆ. *Lond.*
*Solution of Potass.*

Take of
Subcarbonate of potass, one pound;
Fresh lime, half a pound;
Distilled water, boiling, a gallon.

Dissolve the potass in two pints of the water; add the rest of the water to the lime. Mix the liquors while hot, set the mixture aside in a covered vessel; and after it has cooled, filter it through cotton cloth.

If any diluted acid, dropt into it, excite effervescence, more lime must be added, and the filtration repeated.

A pint of this liquor should weigh sixteen ounces.

AQUA KALI CAUSTICI. *Dub.*
*Solution of Caustic Kali.*

Take of
Fresh burnt lime, eight ounces;
Subcarbonate of kali, six ounces.

Put the lime into an earthen vessel, and sprinkle upon it two pints of boiling water. With the slaked lime mix the salt, and cover the vessel. Pour the mass, as soon as it has cooled, into a glass funnel, whose throat is obstructed with a rag. Having covered the funnel, let the ley drop into a vessel placed below it, and pour water from time to time into the funnel, until three pints have passed through.

Let the liquor be agitated, and kept in a bottle of green glass well closed.

If the ley be rightly prepared, it will have neither colour nor smell, and will scarcely effervesce when mixed with acids. If it effervesce considerably, add a little fresh burnt lime, in very fine powder; digest for twenty-four hours in a close vessel, with occasional agitation; then filter the ley in the manner already directed.

The specific gravity of this liquor is to that of distilled water as 1100 to 1000.

THESE processes do not differ materially. They are founded upon the affinity of lime being stronger than that of potass for carbonic acid. Of course, when lime comes in contact with carbonate of potass, the carbonic acid quits the potass to unite with the lime, and the results of the mixture are potass and carbonate of lime. Now, as the carbonate of lime is insoluble in water, and the potass is very soluble, they may be separated by filtration. In doing this, however, we must take care to employ instruments on which the solution of potass

does not act, and to prevent the free access of air, from which it would attract carbonic acid, and thus frustrate the whole operation. The latter object is attained by covering the upper or broad end of the funnel with a plate of glass, and inserting the lower end into the neck of a phial, which it fits pretty closely. The former object is attended with greater difficulties, and indeed scarcely to be effected, so powerful and general is the agency of potass. All animal substances are immediately attacked and destroyed by it; therefore, our filters cannot be made of silk, woollen, or paper which contains glue; and although neither vegetable matters nor silica entirely escape its action, linen and sand are, on the whole, the least objectionable. A filter of sand was used by Dr Black: he first dropt a rugged pebble into the tube of the funnel, in some part of which it formed itself a firm bed, while the inequalities on its surface afforded interstices of sufficient size for the passage of the filtering liquor. On the upper surface of this stone he put a thin layer of lint or clean tow; immediately above this, but not in contact with it, he dropped a stone similar to the former, and of a size proportioned to the swell in the upper part of the tube of the funnel. The interstices between this second stone and the funnel were filled up with stones of a less dimension, and the gradation uniformly continued till pretty small sand was employed. Finally, this was covered with a layer of coarser sand, and small stones, to sustain the weight of the fluid. A filter of sand being thus constructed in the funnel, it was washed perfectly clean, by making clean water pass through it, till it dropt from the lower extremity of the funnel perfectly clear and transparent; and before using it, it was allowed to stand for some days, that no water might remain among the interstices of the sand.

From the spongy nature of the residuum which remains upon the filter, and especially if we use that of sand, a considerable quantity of the solution of potass will be retained. It is, however, easily obtained, by pouring gently over it, so as to disturb it as little as possible, a quantity of water; the ley immediately begins again to drop from the funnel, and as, from the difference of their specific gravity, the water does not mix with it, but swims above it, the whole ley passes through before any of the water. By means of the taste we easily learn when the whole ley has passed.

As it is natural to suppose that the strongest solution will pass first, and the weakest last, we are directed to agitate the whole together, to render their strength uniform.

If the solution of potass be pure, it will be colourless, and

it will neither effervesce with acids, nor form a precipitate with carbonate of potass. If it effervesces, carbonic acid is present, and must be separated by again boiling the solution with a little lime, or by dropping it into lime-water, as long as it produces any precipitate. But Mr Phillips has remarked, that even when a small quantity of carbonic acid is contained in it, no precipitate is produced unless a considerable quantity of lime-water be added. If, on the contrary, it contain lime, from too much of it having been employed in the preparation, it may be separated by dropping into the ley a solution of the carbonate of potass. When we have thus purified our solution of potass, it must be again filtered. Mr Phillips objected to this process as in the London Pharmacopœia of 1809, that the quantity of lime employed was much too large, and from its sponginess retained much of the solution, and in fact 33 parts of lime will saturate the 26 of carbonic acid commonly contained in 100 parts of subcarbonate of potass; and his suggestion has been adopted in the edition 1815. But this objection is obviated by the mode of filtration used by the Edinburgh college; and although from calculation the quantity of lime seems excessive, it is necessary to render the potass perfectly caustic.

*Medical use.*—The solution of caustic potass, under various names, has at different times been celebrated as a lithontriptic, and as often fallen again into disuse. The very contradictory accounts of its effects as a solvent are now, in some degree, explicable, since it has been discovered that urinary calculi are very different in their natures, so that some of them are only soluble in acids, and others only in alkalies. Of the last description are the calculi of uric acid, which are very frequent, and those of urate of ammonia. On these, therefore, alkalies may be supposed to make some impression; and that alkalies, or alkaline carbonates, taken by the mouth, have occasionally relieved calculous complaints, is certain. It is however said, that their continued use debilitates the stomach; and M. Fourcroy has proposed applying the remedy immediately to the disease, by injecting into the bladder a tepid solution of potass or soda, so dilute that it can be held in the mouth. Before the alkaline solution be injected, the bladder is to be completely evacuated of urine, and washed out with an injection of tepid water. After the alkaline injection has remained in the bladder half an hour or more, it is to be evacuated, and allowed to settle. If, on the addition of a little muriatic acid, a precipitate be formed, we shall have reason to conclude that the calculus contains uric acid, and that the alkali has acted on it.

Very dilute alkaline solutions may also be taken into the

stomach as antacids, but we possess others which are preferable.

Mr Brandish, who has strongly recommended the solution of caustic potash for the cure of scrofula, gives the following complicated formula for its preparation.

Take of

American pearl ashes, six pounds,
Fresh burnt lime,
Fresh ashes of ash wood, each two pounds ;
Boiling water, six gallons.

He reverses the common method of slaking lime, by desiring it to be gradually added to the water kept boiling: He then adds the pearl ashes, then the wood ashes ; stirs all together, and lastly draws off the clear liquor slowly. He used to prepare it without the pearl ashes, but found they rendered it softer, which no doubt they would, as the quantity of lime is insufficient to abstract all the carbonic acid, and would leave the liquor in a state of subcarbonate. He says that a wine pint of his solution should weigh 18 or 19 ounces. He recommends the addition of a drop or two of genuine oil of juniper to the pint of liquor, and orders it to be taken twice a-day in the following doses; to a child from four to six, 1 drachm by measure; from six to eight, one drachm and a half; eight to fifteen, 2 drachms; fifteen to eighteen, two and a half; to adults 3 and sometimes 4. It should however be begun in rather smaller doses. The vehicle may be fresh beer, malt-tea, barley-water, or water-gruel.

Externally, alkaline solutions have been more frequently used, either very dilute, simply as a stimulus, in rickets, gouty swellings, gonorrhœa, and spasmodic diseases, or concentrated as a caustic, to destroy the poison of the viper, and of rabid animals.

POTASSA; olim CAUSTICUM COMMUNE ACERRIMUM. *Ed.*
*Potass ;* formerly *Strongest Common Caustic.*

Take of

The solution of potass, any quantity.

Evaporate it in a covered very clean iron vessel, till, on the ebullition ceasing, the saline matter flow gently like oil, which happens before the vessel becomes red. Then pour it out on a bright iron plate ; let it be divided into small pieces before it hardens, and immediately deposited in a well-stopt phial.

POTASSA FUSA. *Lond.*
*Melted Potass.*

Take of
Liquor of potass, one gallon.
Evaporate the liquor in a bright iron vessel over the fire, until after the cessation of the boiling the potass melt. Pour this out upon an iron plate into proper moulds.

KALI CAUSTICUM. *Dub.*
*Caustic Kali.*

Take of
Solution of caustic kali, any quantity.
Evaporate it over the fire in a very clean iron vessel, until, the ebullition having ceased, the saline matter, on increasing the heat, remain almost at rest in the vessel. Let the liquefied salt be poured out upon an iron-plate, and while it is congealing, be cut into proper pieces, which are immediately to be put into a well-closed phial.
During the evaporation, let the operator avoid the drops spirted up.

THE principal thing to be attended to in this operation, is to conduct the evaporation so rapidly that the ley shall not absorb any carbonic acid from the atmosphere. As long as any water of solution remains, the ebullition is evident, and the evaporàtion is to be continued until it cease. The heat is then to be increased a little, which renders the potass perfectly fluid, and gives it the appearance of an oil, when it is ready to be poured out, either on a polished plate, as directed by the colleges, or into iron moulds, such as are used for the melted nitrate of silver.

The potass prepared according to these directions is sufficiently pure for medical use, but is not fit for chemical experiments. We can, however, obtain it perfectly white and crystallized, according to Berthollet, by adding to the ley, when evaporated so far that it would assume the consistence of honey, if permitted to cool, a quantity of alcohol equal to one-third of the carbonate of potass operated on, mixing them together, and letting them boil a minute or two. The mixture is then to be poured into a glass vessel, and corked up, when the impurities will gradually subside, partly in a solid form, and partly dissolved in water. The supernatant alcoholic solution is then to be evaporated rapidly, till its surface become covered with a black crust, which is to be removed, and the liquid below is to be poured into a porcelain vessel, when it will concrete into a white substance, which is

to be broken in pieces, and immediately excluded from the action of the air.

A less expensive way of obtaining potass perfectly pure is that of Lowitz. Evaporate a solution of potass till a thick pellicle form on its surface; allow it to cool, separate all the crystals formed, as they consist of foreign salts; renew the evaporation, in an iron or silver bason; and remove the pellicles which form on the surface with an iron skimmer, as long as any appear. When the ebullition ceases, remove the vessel from the fire, and agitate the fused salt with an iron spatula while it cools. Dissolve the saline mass in twice its weight of water, and evaporate in a silver bason till it begins to crystallize. The crystals are pure potass. The fluid which swims over them has a dark brown colour, and must be poured off; but if kept in a close-stopt phial, it will deposite its colouring matter, and by evaporation will furnish more crystals of potass.

*Medical use.*—Potass is only used as a caustic, or to form solutions of a known strength; and even its use as a caustic is inconvenient, from its being so quickly affected by the air, and from its rapid deliquescence, which renders it apt to spread.

POTASSA CUM CALCE; *olim* CAUSTICUM COMMUNE MITIUS. *Ed.*
*Potass with Lime*; formerly *Milder Common Caustic.*

Take of

Solution of potass, any quantity.

Evaporate it in a covered iron vessel till one-third remains; then mix it with as much new slaked and powdered lime as will bring it to the consistence of pretty solid pap, which is to be kept in a vessel closely stopt.

*Lond.*

Take of

Liquor of potass, three pints;

Fresh lime, one pound.

Boil down the liquor to one pint, then add the lime previously slaked, and mix them intimately.

KALI CAUSTICUM CUM CALCE. *Dub.*
*Caustic Kali with Lime.*

Evaporate solution of caustic kali to one-third, then add as much fresh burnt lime, in powder, as will form a sufficiently thick mass, which is to be kept in a well-closed vessel.

THE addition of the lime in these preparations renders them

less apt to deliquesce, more easily managed, and milder in their operation than fused potass.

SUBCARBONAS POTASSÆ. *Ed.*
*Subcarbonate of Potass.*

Let impure subcarbonate of potass be heated red hot in a crucible. Triturate it with an equal weight of water, after the fæces have subsided, pour the liquor into a very clean iron pot, and boil to dryness, stirring assiduously towards the end of the process, to prevent its sticking to the vessel.

POTASSÆ SUBCARBONAS. *Lond.*
*Subcarbonate of Potass.*

Take of
Impure potashes, in powder, three pounds;
Boiling water, three pints and a half.

Dissolve the potashes in the water, and filter, then pour it into a bright iron vessel, and evaporate the water by a gentle heat until the liquor become thick; then, having removed it from the fire, stir it constantly with an iron spatula until it become a granulated salt

A purer subcarbonate of potass may be prepared in the same manner from Tartar, previously burnt till it becomes of an ash colour.

SUBCARBONAS KALI. *Dub.*
*Subcarbonate of Kali.*

Take of
Potashes, in coarse powder,
Cold water, each six pounds.

Mix them by trituration, and macerate them for a week in a wide vessel, with occasional agitation. Filter the ley, and evaporate it to dryness in a very clean iron vessel. Towards the end of the evaporation, stir the saline mass constantly with an iron spatula. When thus reduced to coarse powder, keep it in close vessels.

Before the ashes are dissolved in the water, if they be not sufficiently pure, roast them in a crucible till they become white.

SUBCARBONAS POTASSÆ PURISSIMUS. *Ed.*
*Pure Carbonate of Potass.*

Take of
Impure supertartrate of potass, any quantity.

Wrap it up in moist bibulous paper, or put it into a cruci-

ble, and burn it into a black mass, by placing it among live coals. Having reduced this mass to powder, expose it in an open crucible to the action of a moderate fire, till it become white, or at least of an ash-grey colour, taking care that it do not melt. Then dissolve it in warm water; strain the liquor through a linen cloth, and evaporate it in a clean iron vessel, diligently stirring it, towards the end of the process, with an iron spatula, to prevent it from sticking to the bottom of the vessel. A very white salt will remain, which is to be left a little longer on the fire, till the bottom of the vessel becomes almost red. Lastly, when the salt is grown cold, keep it in glass vessels, well stopped.

### KALI E TARTARO. *Dub.*
### *Kali from Tartar.*

Take of

Crystals of tartar, any quantity.

Heat them to redness in a silver crucible, loosely covered, until they cease to emit fumes. Reduce the mass which remains to coarse powder, and roast it for two hours in the same crucible, uncovered, stirring it frequently. Boil this in twice its weight of water, for a quarter of an hour, and after the liquor has become pure, pour it off. Repeat this three times.

Filter the mixed leys, and evaporate them in a silver bason.

While the salt which remains is drying, granulate it by frequent agitation, and then heat it to a dull red. Take it out of the vessel before it is quite cold, and keep it in well-stopt phials.

THE potash of commerce we have already shewn to contain a considerable proportion of foreign salts. By the process directed by the colleges, it is purified from those which are crystallizable; and, although it still contains muriate of potass and silica, it is sufficiently pure for the purposes of medicine. Mr Phillips says, when prepared from pearl ash, it consists of about 26 carbonic acid, 71 potash and water, two muriate of potash, and one sulphate of potash, and a little silica.

The purest subcarbonate of potass, in common use, is that obtained by incinerating the impure supertartrate of potass, as all the substances it contains, except the potass, are decomposed by the heat. The tartaric acid and colouring matter are destroyed, and part of the carbonic acid, which is formed, unites with the potass.

But this salt, in whatever way obtained, it is not saturated with carbonic acid, or rather is a mixture of potass and

carbonate of potass, in variable proportions. It is owing to the uncombined potass that it is still deliquescent, and in some degree caustic.

*Medical use.*—Subcarbonate of potass is frequently employed in medicine, in conjunction with other articles, particularly for the formation of saline neutral draughts and mixtures; but it is used also by itself, in doses from three or four grains to fifteen or twenty; and it frequently operates as a powerful diuretic, particularly when aided by proper dilution.

### CARBONAS POTASSAE. *Ed.*
### *Carbonate of Potass.*

Take of
Pure subcarbonate of potass, two parts;
Water, three parts.

Dissolve the subcarbonate in the water, and in a proper apparatus pass through it a stream of carbonic acid gas. Filter the solution, when it ceases to absorb acid, and afterwards evaporate with a heat not exceeding 180° Fahren. so as to obtain crystals.

Carbonic acid gas is easily obtained from equal weights of carbonate of lime in powder and of sulphuric acid diluted with much water.

### POTASSÆ CARBONAS. *Lond.*
### *Carbonate of Potass.*

Take of
Subcarbonate of potass from tartar, one pound;
Subcarbonate of ammonia, three ounces;
Distilled water, one pint.

Add the subcarbonate of ammonia to the potass dissolved in the water. Then expose it for three hours to the heat of 180° in a sand bath, or until the ammonia be expelled.—Lastly, set it aside to crystallize. The residuary liquor may be evaporated in the same manner, so as again to afford crystals on being set aside.

SUBCARBONATE of potass is easily saturated with carbonic acid, by exposing it, in solution, to the contact of the air for a considerable time, or more quickly by making a stream of carbonic acid gas evolved from carbonate of lime by sulphuric acid, pass through a solution of it, or by distilling it with carbonate of ammonia, as proposed by Berthollet, and directed by the London college. The last process is more expensive than the second, but it does not require any particular apparatus.

M. Curadow has proposed a cheaper mode of saturating potass with carbonic acid. He dissolves the potass in a sufficient quantity of boiling water, mixes it with as much dried tanners' bark as to make it pretty dry, and then exposes the mixture, in a covered crucible, to the heat of a reverberatory furnace for half an hour. By lixiviation and crystallization, the mixture he says affords beautiful permanent crystals of carbonate of potass. This is an additional example of the hasty assertions of some chemists, and of the credulity of others in admitting proposed improvements. A solution of carbonate of potass is quickly decomposed by a boiling heat and converted into subcarbonate, and yet M. Curadow asserts that a carbonate is to be got by lixiviating a mass exposed for half an hour to the heat of a reverberatory furnace. Carbonate of potass consists of about 43 acid, 40 potass, and 17 water. The saturation with carbonic acid is one of the best means of purifying the subcarbonate of potass; for it always separates silica from the uncombined alkali; and hence, perhaps, the employment of the subcarbonate from tartar is unnecessarily expensive.

### Liquor potassæ subcarbonatis. *Lond.*
*Solution of Subcarbonate of Potass.*

Take of

Subcarbonate of potass, one pound;

Distilled water, twelve fluidounces.

Dissolve the subcarbonate of potass in the water, and filter through paper.

### Aqua subcarbonatis kali. *Dub.*
*Solution of Subcarbonate of Kali.*

Take of

Subcarbonate of kali, any quantity.

Place it in a wide glass funnel, whose throat is obstructed with a rag. Set this in a cellar, that the salt may deliquesce in the moist air. Let the solution be caught in a vessel placed under it.

The preparation of the Dublin college is the old *Oleum tartari per deliquium*, and is a solution of carbonate of potass in a variable quantity of water; for, by exposure to the air, the subcarbonate attracts not only water, but carbonic acid. It is therefore improperly named. The name of the London college expresses the nature of its preparation, which is nearly uniform in point of strength. Dr Powell says, that the quantities ordered by the college will commonly give a solution amounting to nearly 18 ounces in bulk.

AQUA SUPERCARBONATIS POTASSÆ. *Ed.*
*Solution of Supercarbonate of Potass.*

Take of
Water, ten pounds;
Pure subcarbonate of potass, one ounce;
Dissolve, and expose the solution to a stream of carbonic acid, arising from
Carbonate of lime in powder,
Sulphuric acid, each three ounces;
Water, three pounds, gradually and cautiously mixed.
The chemical apparatus invented by Dr Nooth is well adapted for this preparation. But if a larger quantity of the liquor be required, an apparatus must be used capable of giving sufficient pressure.
The solution must be kept in well-corked vessels.

As soon as the preparation is finished, the liquor should be drawn off into pint bottles, which are to be well-corked, and kept in a cool situation, with the head down, or laid on one side. It should be perfectly transparent, and have an acidulous, not at all alkaline, taste; and, when poured out of the bottles, it should have a sparkling appearance.

*Medical use.*—In this solution, carbonate of potass is combined with excess of carbonic acid, by which means it is better adapted for internal use, as it is rendered not only more pleasant to the state, but is less apt to offend the stomach. Indeed, it is the only form in which we can exhibit potass in sufficient doses, and for a sufficient length of time, to derive much benefit from its use in calculous complaints. It has certainly been frequently of advantage in these affections, but probably only in those instances in which the stone consists of uric acid, or urate of ammonia; for, although supersaturated with carbonic acid, yet the affinity of that acid for potass is so weak, that it really operates as an alkali.

Six or eight ounces may be taken two or three times a-day. It in general proves powerfully diuretic, and sometimes produces inebriation. This last effect is ascribed to the carbonic acid.

ACETAS POTASSÆ. *Ed.*
*Acetate of Potass.*

Take of
Pure subcarbonate of potass, one pound,
Dilute acetic acid, a sufficient quantity.
Boil the subcarbonate in five pounds of acetic acid, and add more acid at different times, till on the watery part of the preceding quantity being nearly dissipated by evaporation,

the new addition of acid ceases to raise any effervescence, which will happen when about twenty pounds of acid have been consumed. The mass is then to be slowly dried. The impure salt remaining is to be melted with a gentle heat, for a short time, but no longer than necessary, and afterwards dissolved in water, and filtered through paper. If the liquefaction has been properly performed, the filtered liquor will be limpid; but if otherwise, of a brown colour. Afterwards evaporate this liquor with a very gentle heat, in a very shallow glass vessel, so that on being removed from the fire, it crystallizes. The acetate of potass ought to be kept in vessels very closely stopped.

### Potassæ acetas. *Lond.*
*Acetate of Potass.*

Take of
Subcarbonate of potass, a pound and a half;
Acetic acid, a gallon.

Mix them together in a large glass vessel, and having evaporated the mixture over the fire to one-half, add gradually as much more acetic acid as may be sufficient to saturate the alkali completely. Evaporate again to one half, and filter. Then evaporate in the water-bath, so that, on being removed from the fire, it shall crystallize.

### Acetas kali. *Dub.*
*Acetate of Kali.*

Take of
Subcarbonate of kali, any quantity.

Add to it, at different times, about five times its weight of distilled vinegar, heated to a moderate temperature. When the effervescence shall have ceased, and the liquor is somewhat evaporated, add, at intervals, distilled vinegar, until the mixture shall entirely cease to effervesce; then evaporate to dryness; and having increased the fire a little, bring the saline mass cautiously into a state of fusion. Dissolve the salt, after it has cooled, in water: filter the solution, and evaporate, until, on removing it from the fire, it shall concrete into a crystalline mass, which should be very white. Put this, as quickly as possible, into vessels accurately closed.

This is both a troublesome and expensive preparation; for, when attempted to be made by simply evaporating to dryness, the salt has always a dark unpleasant colour, which can neither be removed by repeated solution and crystallization, nor

even by solution in alcohol. It is doubtful to what the colour is owing. It has been ascribed by some to part of the acetic acid being decomposed by heat during the exsiccation of the salt: they accordingly recommend the evaporation to be conducted very gently, and the pellicles to be skimmed from the surface of the liquor as fast as they are formed; and in this way, they say, they have procured, at once, a very white salt. Others again ascribe it to accidental impurities, contracted during the operation, and recommend the utmost attention to cleanliness, and the use of earthen vessels; while others ascribe it to some foreign matter, which rises in distillation with the last portions of the acetic acid, and therefore direct, that only the first portions which come over should be used, or that the acetic acid should be distilled with charcoal. The last opinion appears to be the most probable, since, when acetic acid procured from the distillation of an acetate is employed, a colourless solution is obtained, and solutions which become coloured do not at the same time become alkaline. But to whatever cause it be owing, the colour is most effectually destroyed by fusing the salt. The heat necessary to do this decomposes the colouring matter; and on dissolving the fused mass in water, and filtering the solution, we find a fine light charcoal on the filter. But this fusion is attended with considerable loss; for part of the acetic acid itself is decomposed.

To ascertain the exact saturation, litmus and turmeric paper should be alternately employed. Mr Phillips says, that rather more than 21 pints of distilled vinegar, of 1.007, are required to saturate 18 ounces of subcarbonate of potass.

The operator must be particularly careful, in melting it, not to use a greater heat, nor keep it longer liquefied, than what is absolutely necessary: a little should be occasionally taken out, and put into water; and, as soon as it begins to part freely with its black colour, the whole is to be removed from the fire.

The exsiccation of the solution of the salt, after it has been fused, must be conducted very carefully, as it is exceedingly apt to be decomposed, which would render a new solution and exsiccation necessary. The test of its purity, by dissolving it in alcohol, as directed by the London college, is to discover if any of the acetic acid itself has been decomposed in the operation; for the carbonate of potass, which is in that case formed, is insoluble in alcohol.

To spare trouble and expence, attempts have been made to prepare acetate of potass with undistilled vinegar, and even

with the residuum of the distillation of acetic acid; and they have been to a certain degree, successful: but, as repeated fusion and crystallization are necessary to bring the salt to a certain degree of purity, it does not appear that they were more economical. But if, to acetate of potass, prepared with impure vinegar, we add a sufficient quantity of sulphuric acid, we obtain by distillation an acetic acid of great strength, which forms a beautiful acetate of potass without fusion. Lastly, this salt may be prepared by the decomposition of acetates; for example, of the acetate of lime, by tartrate of potass.

Acetate of potass has a sharp, somewhat pungent taste. It is deliquescent, and is soluble in about its own weight of water, at 60°, but Mr Phillips says in half its weight, at 40°. It is also, according to Dr Powell, soluble in alcohol in four times its weight. It is decomposed by the stronger acids; by a decoction of tamarinds; by the sulphates of soda and of magnesia; by muriate of ammonia; by the tartrate of soda and potass; and by some metalline salts. Its acid is destroyed by a high temperature.

*Medical use.*—Acetate of potass, however prepared, provided it be properly made, is a medicine of great efficacy, and may be so dosed and managed as to prove either mildly cathartic, or powerfully diuretic: few of the saline deobstruents equal it in virtue. The dose is from half a scruple to a drachm or two. A simple solution, however, of carbonate of potass in vinegar, without exsiccation, is perhaps not inferior, as a medicine, to the more expensive salt. Two drachms of the alkali, saturated with vinegar, have produced, in hydropic cases, ten or twelve stools, and a plentiful discharge of urine, without any inconvenience.

### SULPHAS POTASSÆ. *Ed.*
### *Sulphate of Potass.*

Dissolve the acidulous salt which remains after the distillation of nitrous acid in warm water, and having removed the superfluous acid by adding carbonate of lime in powder, set it aside until the fæces subside. Then evaporate the decanted solution, after being filtered, so that it crystallize.

### POTASSÆ SULPHAS. *Lond.*
### *Sulphate of Potass.*

Take of

The salt which remains after the distillation of nitric acid, two pounds;

Boiling water, two gallons.

Mix them so as to dissolve the salt, and then add as much subcarbonate of potass as will saturate the excessive acid. Then boil to a pellicle, and, after filtration, set it aside to crystallize. Decant off the liquor, and dry the crystals on blotting paper.

### Sulphas kali. *Dub.*
### *Sulphate of Kali.*

Let the salt which remains after the distillation of nitrous acid be reduced to powder, and dissolved in a sufficient quantity of boiling water. Add as much potash as will saturate the superfluous acid. Let the filtered liquor be evaporated with a very gentle heat, that it may crystallize.

This salt is very seldom prepared on purpose, as it may be obtained from the residuum of many other preparations, by simple solution and crystallization; for so strong is the affinity between sulphuric acid and potass, that they scarcely ever meet without combining to form this salt. All the sulphates, except that of baryta, are decomposed by potass and most of its combinations; and reciprocally, all the compounds of potass are decomposed by sulphuric acid and most of its combinations; and in all these decompositions, sulphate of potass is one of the products.

The greatest part of the sulphate of potass of commerce is obtained from the residuum of the distillation of sulphate of iron with nitrate of potass, by lixiviating it, supersaturating the solution with carbonate of potass, filtering it boiling hot, and allowing it to crystallize. The liquor remaining after the precipitation of magnesia is also a solution of sulphate of potass. It is likewise got in considerable quantities from the residuum remaining in the retort, after the distillation of nitrous acid, and the London and Dublin colleges have given directions for obtaining it, in this way, by simply saturating the excess of acid with subcarbonate of potass. Mr Phillips says it would be more economical to saturate any unavoidable excess of acid by lime, and reject the sulphate of lime formed, as the sulphate of potass is not so costly as the carbonate of potass used to make it. This process has been adopted by the Edinburgh college.

Sulphate of potass forms small, transparent, very hard crystals, generally aggregated in crusts, and permanent in the air. Their primitive form is pyramidal dodecahedrons with isosceles triangular faces meeting at the summit, at an angle of about 66.:5, and at the base 1 3.45. It has a bitter taste, is slowly soluble in water, requiring 16 waters, at 60°, and 4 at

212°. It is not soluble in alcohol. It decrepitates when thrown on live coals, and melts in a red heat.

It consists of 32.8 acid, and 67.2 potash and water, according to Mr Phillips. It is decomposed by the barytic salts; by the nitrates and muriates of lime and of strontia; by the tartrates partially; and by the salts of mercury, silver, and lead.

*Medical use.*—Sulphate of potass, in small doses, as a scruple, or half a drachm, is an useful aperient; in larger ones, as four or five drachms, a mild cathartic, which does not pass off so hastily as the sulphate of soda, and seems to extend its action farther.

### POTASSÆ SUPERSULPHAS. *Lond.*
### *Supersulphate of Potass.*

Take of

The salt which remains after the distillation of nitric acid, two pounds,

Boiling water, four pints.

Mix, dissolve the salt, and filter. Then boil down to one-half, and set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

THIS salt is acid to the taste, reddens vegetable blues, and effervesces with alkaline carbonates. Mr Phillips found, that 100 grains required 25 of dried subcarbonate of soda for saturation. It is directed by Lowitz to be prepared by mixing seven parts of sulphuric acid with the same quantity of water in a large matrass, and adding to the hot mixture, as quickly as possible, four parts of potashes in fine powder. On cooling, the supersulphate of potass shoots in fine large crystals, whose primitive form is an acute rhomboid of 74° and 106°. These are to be quickly washed in water and dried. This mode of directly preparing it is, however, unnecessary, as it is produced in sufficient quantity in the distillation of nitric acid. Its preparation, however, is attended with some difficulty, and Mr Phillips at first thought that there was no supersulphate, as he only obtained from the residuum of the distillation of nitrous acid, sulphate with acid adhering to it. From subsequent experiments, he is of opinion, that it may be made to yield supersulphate or sulphate, according as the solution is more or less concentrated. When the residual salt is dissolved in only about an equal weight of water, Mr Phillips found it deposite, on cooling, supersulphate of potass, without any appearance of pellicle; but if the solution be evaporated to a pellicle, according to the former directions of

the college, the whole concretes into a solid mass; and when the solution is not perfectly concentrated, the crystals obtained are sulphate of potass. This salt was formerly called *Sal enixum* and *Tartarus vitriolatus acidus.* It is soluble in two waters at 60°, and less than one at 212°. It consists of ·37 parts of sulphate of potass, and 33 sulphuric acid.

It is used in its unrefined state by silversmiths, and is recommended by Lowitz for preparing acetic acid, by decomposing acetate of soda. It promises to be a valuable medicine, as enabling us to give sulphuric acid in combination with an aperient salt, and being less disagreeable and more soluble than the neutral sulphate.

### SULPHAS POTASSÆ CUM SULPHURE. *Ed.*
### *Sulphate of Potass with Sulphur.*

Take of
  Nitrate of potass in powder;
  Sublimed sulphur, of each equal parts.

Mingle them well together, and inject the mixture, by little and little at a time, into a red hot crucible; the deflagration being over, let the salt cool, after which it is to be put into a glass vessel well corked.

In this process the nitric acid of the nitrate of potass is decomposed by the sulphur, which is in part acidified. But the quantity of oxygen contained in the nitric acid is not always sufficient to acidify the whole sulphur employed; therefore, part of it remains in the state of sulphureous acid, which is probably chemically combined with part of the potass in the state of sulphite; for the whole saline mass formed is more soluble in water than sulphate of potass. It is crystallizable, and by exposure to the air gradually attracts oxygen, and is converted into sulphate, or perhaps supersulphate of potass; for even when recently prepared, it is manifestly acid. But this preparation, like all those depending on the uncertain action of fire, is apt to vary. In some experiments which I made to determine the state in which the sulphur existed in this salt carefully prepared, it seemed to be sulphuric acid; for it neither gave out a sulphureous smell on the addition of sulphuric acid, nor was a solution of it precipitated by acids. In others the presence of sulphuretted hydrogen was obvious; but in no instance could sulphur, in any notable quantity, be detected. Hence its Edinburgh name, *Sulphas potassæ cum sulphure*, and the mode of preparation proposed by some, of simply triturating these substances together, are manifestly incorrect. In its medical effects and exhibition, it agrees

with sulphureous mineral waters, which contain a proportion of neutral salt.

### TARTRAS POTASSÆ. *Ed.*
*Tartrate of Potass.*

Take of
Subcarbonate of potass, one part;
Supertartrate of potass, three parts, or as much as may be sufficient;
Boiling water, fifteen parts.

To the subcarbonate of potass, dissolved in the water, gradually add the supertartrate of potass in fine powder, as long as it raises any effervescence, which generally ceases before three times the weight of the carbonate of potass has been added; then strain the cooled liquor through paper; and, after due evaporation, set it aside to crystallize.

### POTASSÆ TARTRAS. *Lond.*
*Tartrate of Potass.*

Take of
Subcarbonate of potass, sixteen ounces;
Supertartrate of potass, three pounds;
Boiling water, one gallon.

Dissolve the subcarbonate of potass in the water, then add the supertartrate of potass in powder, until it cease to excite effervescence. Filter the liquor through paper. Then evaporate until a pellicle be formed, and set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

### TARTARAS KALI *Dub.*
*Tartrate of Kali.*

Take of
Subcarbonate of kali, one pound;
Crystals of tartar, in very fine powder, two pounds and a half, or as much as will saturate the kali;
Boiling water, a gallon.

Gradually add the tartar to the subcarbonate of kali dissolved in the water; strain the liquor through paper, evaporate it, and let it crystallize by cooling.

THE tartaric acid is capable of uniting with potass in two proportions, forming in the one instance a neutral, and in the other an acidulous salt. The latter is an abundant production of nature; but it is easily converted into the former, by saturating it with potass, or by depriving it of its excess of

acid. It is by the former method that the colleges direct tartrate of potass to be prepared; and the process is so simple, that it requires little comment. For the sake of economy, we should come as near the point of saturation as possible; but any slight deviation from it will not be attended with much inconvenience. Indeed it is perhaps advisable to have a slight excess of acid, which, forming a small quantity of very soluble salt, leaves the remainder perfectly neutral. This is the case in the process of the Pharmacopœia, as Mr Phillips says that 36 (30?) parts of supertartrate of potass require 15.7 of subcarbonate for their saturation, instead of 12, the quantity ordered. The evaporation must be conducted in an earthen vessel, for iron discolours the salt. It is easily crystallized, and the crystals become moist in the air. We have here a striking example of the change produced upon crystals, by saturating the excessive acid of a super-salt, the primitive form of the supertartrate being a rectangular octohedron, and of the tartrate a rectangular tetrahedral prism. It has an unpleasant bitter taste. It is soluble in four parts of cold water, and still more soluble in boiling water, and it is also soluble in alcohol. It is totally or partially decomposed by all acids. On this account it is improper to join it with tamarinds, or other acid fruits; which is too often done in the extemporaneous practice of those physicians who are fond of mixing different cathartics together, and know little of chemistry. It is also totally decomposed by lime, baryta, strontia, and magnesia, partially by the sulphates of potass, soda, and magnesia, and by the muriate of ammonia.

*Medical use.*—In doses of a scruple, half a drachm, or a drachm, this salt is a mild, cooling aperient: two or three drachms commonly loosen the belly; and an ounce proves pretty strongly purgative. It has been particularly recommended as a purgative for maniacal and melancholic patients. It is an useful addition to the purgatives of the resinous kind, as it promotes their operation, and at the same time tends to correct their griping quality.

### SUBCARBONAS SODÆ. *Ed.*
### *Subcarbonate of Soda.*

Take of

Impure subcarbonate of soda, any quantity.

Bruise it; then boil in water till all the salt be dissolved. Strain the solution through paper, and evaporate it in an iron vessel, so that after it has cooled the salt may crystallize.

*Dub.*

Take of

Barilla, in powder, ten pounds;
Water, two gallons.

Boil the barilla in the water, in a covered vessel, for two hours, agitating it from time to time. Strain the liquor, and boil the barilla which remains, after triturating it again with an equal quantity of water. This may be repeated a third time. Evaporate the leys, filtered and mixed, in a wide iron vessel, to dryness, taking care that the saline mass remaining be not again liquefied by too great a degree of heat, and agitate it with an iron spatula, until its colour become white. Lastly, dissolve it in boiling water; and, after due evaporation, let it crystallize by slow refrigeration. The crystals will be purer, if, before each boiling, the barilla be exposed to the air for some time. It should be crystallized when the air is at the freezing temperature, and in a liquor whose specific gravity is 1220.

If the salt be not pure, repeat the solution and crystallization.

SODÆ SUBCARBONAS. *Lond.*
*Subcarbonate of Potass.*

Take of

Impure soda in powder, one pound;
Boiling distilled water, four pints.

Boil the soda in the water for half an hour, and filter. Evaporate the solution to two pints, and set it aside to crystallize. Throw away the residuary liquor.

THESE directions are principally intended for the purification of the Spanish barilla, which is a fused mass, consisting, indeed, principally of carbonate of soda, but also containing charcoal, earths, and other salts. The two first causes of impurity are easily removed by solution and filtration, and the salts may be separated by taking advantage of their different solubility in cold and in hot water. But the preparation of carbonate of soda, by the decomposition of sulphate of soda, has now become a manufacture, and is carried to such perfection, that its further purification is almost unnecessary for the purposes of the apothecary.

The primitive form is an octohedron, with a rhombic base of 60° and 120°, the planes of which meet at the summit at 104, and at the base at 76°.

SODÆ SUBCARBONAS EXSICCATA. *Lond.*
*Dried Subcarbonate of Soda.*

Take of
Subcarbonate of soda, one pound.

Apply a boiling heat to the subcarbonate of soda in a clean iron vessel, until it be perfectly exsiccated, stirring it continually with an iron spatula. Lastly, reduce it to powder.

CARBONAS SODÆ SICCATUM. *Dub.*
*Dried Carbonate of Soda.*

Liquefy, over the fire, crystals of carbonate of soda, in a silver crucible, and then, increasing the heat, stir the liquefied salt, until, by the consumption of the water, it become dry.

Reduce it to fine powder, and keep it in close vessels.

SUBCARBONATE of soda, deprived of its water of crystallization, is a very excellent remedy, for which we are indebted to Dr Beddoes; he desires it to be prepared by simply exposing the pounded crystals before the fire; which appears to be preferable to the process directed by the colleges, in which much of the carbonic acid may be expelled. By simple efflorescence, crystallized carbonate of soda loses more than half its weight, and falls down into a fine permanent powder. Whenever soda is prescribed in the form of pills, the effloresced carbonate is to be used, as, when made of the crystallized salt, they crack, and fall to pieces by the action of the air upon them.

*Medical use.*—Dr Beddoes first recommended the powder of effloresced soda, in calculous complaints, as a substitute for the supercarbonated alkaline waters, when these produced giddiness, or were too expensive; but its use has since been extended much farther; and it is found to be, not only an excellent antacid, but seems almost to possess specific virtues in affections of the urinary organs. One or two scruples may be given, in the course of the day, in the form of powder, or in pills made up with soap and some aromatics.

CARBONÆ SODAS. *Ed.*

Take of
Subcarbonate of soda, two parts;
Water, three parts.

Dissolve the salt in the water, and pass through it a stream of carbonic acid gas, until it cease to be absorbed. Filter the liquor, and evaporate with a heat not exceeding 180, so that it form a crystalline mass.

Carbonic acid is most easily obtained from equal weights of carbonate of lime in powder, and of sulphuric acid diluted with much water.

SODÆ CARBONAS. *Lond.*
*Carbonate of Soda.*

Take of
Subcarbonate of soda, one pound;
Subcarbonate of ammonia, three ounces;
Distilled water, a pint.

Add the ammonia to the subcarbonate of soda dissolved in the water; then apply a heat of 180°, in a sand bath, for three hours, or until all the ammonia be expelled. Lastly, set it aside to crystallize.

In the same manner evaporate the residuary liquor, and set it aside again to crystallize.

THIS salt bears the same relation to the subcarbonate of soda that the carbonate of potass does to its subcarbonate. Klaproth first described it, and says it consists of 39 carbonic acid, 38 soda, and 23 water. It is found native in hard striated masses in the province of Sukena in Africa, and is called *Trona.*

Mr Phillips objects on calculation to the quantity of carbonate of ammonia employed by the London college, as unnecessarily too large; for in subcarbonate of soda, the alkali is to the acid as three to two, and in the carbonate they are equal, and in 100 parts of crystals of subcarbonate are 35 of salt, consisting of 21 soda and 14 acid, requiring therefore 7 additional acid to neutralize it. Now, as 100 carbonate of ammonia contains 50 acid, it follows, that 14 will furnish the necessary acid, and that 25, the quantity ordered by the college, is excessive.

AQUA SUPERCARBONATIS SODÆ. *Ed.*
*Solution of Supercarbonate of Soda.*

Take of
Water, ten pounds;
Subcarbonate of soda, two ounces.

Dissolve and pass through it a stream of carbonic acid gas, arising from
Powder of carbonate of lime;
Sulphuric acid, of each three pounds;
Water, three pounds, gradually and cautiously mixed.

Nooth's apparatus is well adapted for this process. But if a larger quantity of this solution be required, an apparatus must be used capable of furnishing sufficient pressure. The liquor should be kept in well-corked vessels.

By supersaturating soda with carbonic acid, it is rendered more agreeable to the palate, and may be taken in larger quantities, without affecting the stomach. This is now in common use as a cooling beverage, under the title of soda-water; and it may not be unnecessary to mention, that its place cannot be at all supplied by what is sold as soda powder, which is not a supercarbonate of soda, but merely a mixture of salts, which effervesces on being dissolved. Indeed, one moment's reflection must shew the impossibility of reducing to a solid form, a salt which cannot exist in solution, except under very great pressure.

### Phosphas sodæ. *Ed.*
### *Phosphate of Soda.*

Take of

Bones burnt to whiteness, and powdered, ten pounds;
Sulphuric acid, six pounds;
Subcarbonate of soda, a sufficient quantity.

Mix the powdered bones with the sulphuric acid in an earthen vessel; then add the water, and mix again; add nine pounds of water: then place the vessel in a vapour bath, and digest for three days; after which, dilute the mass with nine pounds more of boiling water, and strain the liquor through a strong linen cloth. Lastly, pour over the mass boiling water, until the whole phosphoric acid be washed out. Set by the strained liquor, that the impurities may subside; decant the clear solution, and evaporate it to nine pounds. To this liquor poured from the impurities, and heated in an earthenware vessel, add subcarbonate of soda, dissolved in warm water, until the effervescence cease. Filter, and set it aside to crystallize. To the liquor that remains after the crystals are taken out, add a little subcarbonate of soda, if necessary, so as to saturate exactly the phosphoric acid; and dispose the liquor, by evaporation, to form crystals, as long as it wil lfurnish any. Lastly, the crystals are to be kept in a well-closed vessel.

### *Dub.*

Take of

Burnt bones, in powder, five pounds;
Sulphuric acid, three pounds and a half, by weight.

Mix the powder, in an earthen vessel, with the sulphuric acid; gradually add five pints of water, and agitate the mixture; digest for three days, adding, from time to time, more water, to prevent the mass from becoming dry, and continue the agitation: then add five pints of boiling water, and

strain through linen, pouring on boiling water repeatedly, until all the acid be washed out. Set aside the strained liquor until the fæces subside, from which pour it off; and reduce, by evaporation, to one half: then add, of carbonate of soda (dissolved in a sufficient quantity of warm water,) three pounds ten ounces. Filter; and, by alternate evaporation and cooling, let it form crystals, which are to be kept in a well-closed vessel.

If the salt be not sufficiently pure, dissolve and crystallize it again.

The first part of this process consists in destroying the gelatine of the bones, by the action of heat. When burnt to perfect whiteness, they retain their form, but become friable, and consist of phosphate of lime, mixed with a very little carbonate of lime and carbonate of soda. In performing this part of the process, we must take care not to heat the bones to a bright red, as by it they undergo a kind of semi-fusion, and become less soluble. The complete combustion of the charcoal is facilitated by the free contact of the air: we must, therefore, bring every part, in succession, to the surface, and break the larger pieces.

In the second part of the process, the phosphate of lime is decomposed by the sulphuric acid. This decomposition is, however, only partial. The sulphuric acid combines with part of the lime, and forms insoluble sulphate of lime. The phosphoric acid, separated from that portion of lime, immediately combines with the rest of the phosphate of lime, and forms superphosphate of lime, which is not farther decomposable by sulphuric acid.

The superphosphate of lime, thus formed, is soluble in water; but, as the sulphate of lime, with which it is mixed, concretes into a very solid mass, it is, in some measure, defended from the action of water. On this account, the whole mass is directed to be digested, for three days, in vapour, by which means it is thoroughly penetrated, and prepared for solution in the boiling water, which is afterwards poured on it. It is probably to render the subsequent solution easier, that Thenard directs the bone-ashes to be made with water into a thin paste *(bouillé,)* before the sulphuric acid is added to them.

Having thus got a solution of superphosphate of lime, it is next decomposed by carbonate of soda, dissolved in water. This decomposition, likewise, is only partial, as it deprives the superphosphate of lime of its excess of acid only, and reduces it to the state of phosphate. The phosphate of lime, being insoluble, is easily separated by filtration, and the phos-

phate of soda remains in solution. According to Thenard, the nicest point in the whole process is the determination of the proper quantity of carbonate of soda to be added As the phosphate of soda does not crystallize freely, unless there be a slight excess of base, he directs, that a little more carbonate of soda be added than what is merely sufficient to saturate the excess of acid in the superphosphate of lime, but not to continue the addition until it cease to produce any precipitate. We must also take care not to carry the evaporation of the solution of phosphate of soda so far as to form a pellicle; for it then concretes into an irregular mass, and does not form beautiful crystals. After each crystallization, we must examine the liquor which remains, and, if it be acid, or merely neutral, add to it a little of the solution of carbonate of soda. In this way, Thenard got from 2100 parts of bone ashes, 700 of sulphuric acid, and 667 of carbonate of soda, 885 of phosphate of soda. According to Fourcroy, phosphate of lime consists of 0.41 acid, and 0.59 lime, and superphosphate of lime of 0.54 acid, and 0.46 lime: phosphate of lime treated with sulphuric acid, is only deprived of 0.24 lime, and changed into 0.76 of superphosphate, consisting of 0.59 phosphate of lime, and 0.17 of phosphoric acid; and it is only with this portion of acid that we are able to combine soda. Fourcroy is also of opinion, that phosphate of lime requires only 0.4 of its weight of sulphuric acid to decompose it, whereas 0.6 are employed by the Edinburgh college, and 0.7 by the Dublin. This is not only, therefore, a waste of acid, but it renders the product impure, by being mixed with sulphate of soda, which is sometimes actually the case in the phosphate of commerce. Besides, as bone ashes are of very little value, it is better that a portion of them should escape undecomposed, than that an excess of acid should be added to them.

Mr Funcke, of Linz, has discovered a still more economical and expeditious method. It consists in saturating the excess of lime in calcined bones with diluted sulphuric acid, and then dissolving the remaining phosphate of lime in nitric acid. To this solution he adds an equal quantity of sulphate of soda, and then recovers the nitric acid by distillation. The phosphate of soda is then separated from the sulphate of lime, by the affusion of water and crystallization.

Phosphate of soda crystallizes in rhomboidal prisms, terminated by three-sided pyramids. Its taste resembles that of common salt. At 60° it is soluble in four parts of water, and at 212° in two. It effloresces in the air. By heat, it undergoes the watery fusion, and at last melts into a white mass. It consists, according to Thenard, of 15 phosphoric acid, 19 so-

da, and 66 water of crystallization. It is decomposed by most of the salts having an earthy base.

*Medical use.*—Phosphate of soda was introduced into the practice of physic by the ingenious Dr George Pearson of London. It possesses the same medical qualities as sulphate of soda, and the tartrate of potass and soda, being an excellent purgative, in the quantity of an ounce or ten drachms; and it has the peculiar advantage over these two salts, of being much less nauseous than they are. Its taste is extremely similar to that of common salt; and, when given in a bason of water gruel, or veal broth, made without salt, it is scarcely perceptible by the palate; and consequently it is well adapted for patients whose stomachs are delicate, and who have an antipathy against the other saline purges. The only objection to its general use is the very great difference between its price and that of sulphate of soda; a difference which might certainly be diminished.

### MURIAS SODÆ SICCATUM. *Dub.*
### *Dried Muriate of Soda.*

Take of

Muriate of soda, any quantity.

Roast it over the fire in an iron vessel, loosely covered, until it cease to decrepitate, agitating it from time to time.

BY this process, the muriate of soda is reduced into the state in which it is employed for the distillation of muriatic acid. It not only deprives it entirely of its water of crystallization, which, from being variable in quantity, would otherwise render the acid obtained unequal in strength, but also destroys some colouring matter which it contains; for, if we prepare muriatic acid from crystallized muriate of soda, we obtain a coloured muriatic acid, while the decrepitated muriate furnishes a perfectly colourless one.

### SULPHAS SODÆ. *Ed.*
### *Sulphate of Soda.*

Dissolve the acidulous salt, which remains after the distillation of muriatic acid, in water; and having mixed powdered chalk with it, to remove the superfluous acid, set it aside until the sediment subsides; then strain through paper the liquor decanted from them, and evaporate so that it may crystallize.

### SODÆ SULPHAS. *Lond.*

Take of

The salt which remains after the distillation of muriatic acid, two pounds;

Boiling water, two pints and a half.

Dissolve the salt in the water, and gradually add as much subcarbonate of soda as will saturate the excessive acid. Evaporate until a pellicle appear, and, after filtering the liquor, set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

*Dub.*

Dissolve the salt, which remains after the distillation of muriatic acid, in a sufficient quantity of boiling water. Filter the solution, and after due evaporation, crystallize the salt by slow refrigeration.

The Edinburgh college do not preserve the superabundant acid, by saturating it with carbonate of soda, as the London college, but get rid of it by saturating it with carbonate of lime, with which it forms an insoluble sulphate of lime. In fact, the price of sulphate of soda is so very small, that it is no economy to use carbonate of soda to saturate the superabundant acid.

By far the greatest part of the sulphate of soda is obtained from manufacturers, as a result of processes performed for the sake of other substances, as in the preparation of muriate of ammonia, oxygenized muriatic acid, &c. It may be economically obtained by making into a paste, with a sufficient quantity of water, eight parts of burnt gypsum, five of clay, and five of muriate of soda. This mixture is burnt in a kiln or oven, then ground to powder, diffused in a sufficient quantity of water, and, after being strained, is evaporated and crystallized.

The primitive form appears to be a right rhomboid prism of about 72 and 108.

Sulphate of soda crystallizes in six-sided prisms, terminated by dihedral summits. The crystals are often irregular, and their sides are usually channelled. Their taste is at first salt, and afterwards disagreeably bitter. They are soluble in 2.67 parts of water at 60°, and in 0.8 at 212°. In the air they effloresce. They undergo the watery fusion, and, in a red heat, melt. They consist of 23.52 sulphuric acid, 18.48 soda, and 58 water; and when dried at 700°, of 56 acid, and 44 soda. It is decomposed by baryta and potass, and salts containing these bases, and by the salts of silver, mercury, and lead.

*Medical use.*—Taken from half an ounce to an ounce, or more, it proves a mild and useful purgative; and in smaller doses largely diluted, a serviceable aperient and diuretic. It is

commonly given in solution, but it may also be given in powder, after it has effloresced. In this form the dose must be reduced to one-half.

TARTRAS POTASSÆ ET SODÆ. *Ed.*
*Tartrate of Potass and Soda.*

Take of
Subcarbonate of soda, one part;
Supertartrate of potass, three parts, or a sufficient quantity;
Boiling water, fifteen parts.

To the subcarbonate dissolved in the water, add the supertartrate in fine powder as long as it produces any effervescence, which commonly ceases before three times the weight of the subcarbonate be added. Then filter the liquor after it is cold through paper, and after due evaporation set it aside to crystallize.

TARTARAS SODÆ ET KALI. *Dub.*
*Tartrate of Soda and Kali.*

Take of
Carbonate of soda, twenty ounces;
Crystals of tartar in very fine powder, two pounds;
Distilled water, boiling, ten pints.

Dissolve the subcarbonate of soda in the water, and gradually add the crystals of tartar; filter the iquor through paper; evaporate, and set it aside to crystallize by slow cooling.

SODA TARTARIZATA. *Lond.*
*Tartarized Soda.*

Take of
Subcarbonate of soda, twenty ounces;
Supertartrate of potass, in powder, two pounds;
Boiling water, ten pints.

Dissolve the subcarbonate of soda in the water, and gradually add the supertartrate of potass. Filter the solution through paper; evaporate until a pellicle be formed, and set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

THE tartaric acid, in several instances, is capable of entering into combination, at the same time, with two bases. In the present example, the superabundant acid of the supertartrate of potass is neutralized with soda, and, in place of a mixture of tartrate of potass and tartrate of soda, each possessing their own properties, there results a triple salt, having peculiar properties.

The tartrate of potass and soda forms large and very regular crystals, in the form of prisms with eight sides, nearly equal, which are often divided longitudinally, almost through their axis. The principal form is a rhomboidal tetrahedral prism of 80° and 100°, with rhombic faces. It has a bitter taste. It is soluble in about five parts of water, and effloresces in the air. It is decomposed by the strong acids, which combine with the soda, and separate supertartrate of potass, and by baryta and lime. By heat its acid is destroyed. It consists of 54 tartrate of potass, and 46 tartrate of soda. Mr Phillips found that 18 parts of subcarbonate of soda were sufficient to neutralize 24 of supertartrate of potass.

*Medical use.*—It was introduced into medical practice by M Seignette, an apothecary at Rochelle, whose name it long bore, and is still very much employed as an excellent purgative salt.

### AQUA AMMONIÆ. *Ed.*
### *Water of Ammonia.*

Take of
- Muriate of ammonia, one pound;
- Quicklime, fresh burnt, one pound and a half;
- Distilled water, one pound;
- Water, nine ounces.

Pour the water on the powdered lime, contained in an iron or earthen vessel, which is then to be covered up until the slaked lime cool. Then mix the muriate, previously ground into very fine powder, thoroughly with the lime, by triturating them together in a mortar, and immediately put the mixture into a glass retort. Place the retort in a sand-bath, and connect with it a receiver furnished with a tube which is to be inserted almost to the bottom of a phial, containing the distilled water. But the phial should be only half filled.

The fire is now to be kindled, and gradually increased, until the bottom of the sand-pot becomes red, and no more gas and liquor come over.

### AQUA AMMONIÆ CAUSTICÆ. *Dub.*
### *Water of Caustic Ammonia.*

Take of
- Muriate of ammonia, sixteen ounces;
- Lime, fresh burnt, two pounds;
- Water, six pints.

Sprinkle one pint of the water upon the lime, placed in a stoneware vessel, and cover it up. Twenty-four hours afterwards, mix the salt with the lime, which will have

crumbled to powder, taking care to avoid the vapours. Then put the mixture into a retort, and pour upon it the rest of the water. Having previously agitated them, draw off, with a moderate heat, twenty ounces, by measure, of liquor, into a refrigerated receiver, having luted carefully the joining of the vessels.

The specific gravity of this liquor is to that of distilled water as 936 to 1000.

### Liquor ammoniæ. *Lond.*
### *Liquor of Ammonia.*

Take of

Muriate of ammonia, eight ounces;
Fresh lime, six ounces;
Water, four pints.

Pour a pint of the water upon the lime; then cover the vessel and set it aside for an hour; afterwards add the muriate of ammonia and the rest of the water previously heated to ebullition, and cover up the vessel again. Filter the liquor after it has cooled, and draw off by distillation twelve fluid-ounces of liquor of ammonia.

The specific gravity of liquor of ammonia is to that of water as 0.960 to 1.000.

The lime is slaked before it is mixed with the muriate of ammonia, in order that the heat generated during the slaking may not decompose the muriate when they are mixed before adding the water.

In this process, the muriate of ammonia is decomposed by the lime, in consequence of its having a stronger affinity for muriatic acid than ammonia has. It is absolutely necessary that the lime employed be very recently burnt, as the presence of carbonic acid would render the ammonia partially carbonated. This accident is also prevented by the great excess of lime used, which, having a greater affinity for carbonic acid than ammonia has, retains any small quantity of it which may be accidentally present. The water is essential to the existence of the ammonia in a liquid form; for, in itself, it is a permanently elastic fluid. In the process adopted by the Dublin college, a much greater quantity of water, however, is used than what is sufficient to absorb all the ammonia: the rest is intended to render the decomposition slower and more manageable, and to keep the muriate of lime, which remains in the retort, in solution; for otherwise it would concrete into a solid mass, adhering strongly to the bottom of the retort, very difficult to be washed out, and often endangering

its breaking. A very small degree of heat is sufficient for the distillation, and the whole ammonia rises with the first portion of water, or even before it. It is therefore necessary that the vessels be very closely luted to each other, to prevent it from escaping. But this renders the utmost care necessary in the distillation; for too sudden or too great a heat, from the rapid disengagement of gas, or even the expansion of the air contained in the vessels, would endanger their bursting.

In the process directed in the Edinburgh Pharmacopœia, this danger is completely obviated, by disengaging the ammonia in the form of gas, and combining it with the water, by means of pressure in a pneumatic apparatus. By this process, the water should be saturated with ammonia; but of this strength it is never sold in the shops, unless particularly desired, as, for common sale, it is always diluted with a certain proportion of water.

Dörfurt, Bucholz, and Van Mons, agree in recommending nearly the following process, which resembles that of the Edinburgh college. Slake 16 oz. of lime with a sufficient quantity of water to form a thick paste; put it into a cucurbit, and add 16 oz. of sal ammoniac; lute on the capital, furnished with a bent tube, reaching to the bottom of a receiver containing 24 oz. of water, and draw off 24 oz., so as to fill the space of 48 oz. previously marked on the receiver, and keep it in phials perfectly closed, by dipping their necks when corked in wax.

We have already mentioned the properties of ammonia in its gaseous form. When combined with water, it imparts to it many of these properties, and lessens its specific gravity.

*Table of the quantities of Real or Gaseous Ammonia in solutions of different Specific Gravities. (Dalton.)*

| Specific Gravity. | Grains of ammonia in 100 water grain measures of liquid. | Grains of ammonia in 100 grains of liquid. | Boiling point of the liquid. Fahr. scale. | Volume of gas condensed in a given vol. of liquid. |
|---|---|---|---|---|
| .85 | 30 | 35.3 | 26° | 494 |
| .86 | 28 | 32.6 | 38 | 456 |
| .87 | 26 | 29.9 | 50 | 419 |
| .88 | 24 | 27.3 | 62 | 382 |
| .89 | 22 | 24.7 | 74 | 346 |
| .90 | 20 | 22.2 | 86 | 311 |
| .91 | 18 | 19.8 | 98 | 277 |
| .92 | 16 | 17.4 | 100 | 244 |
| .93 | 14 | 15.1 | 122 | 211 |
| .94 | 12 | 12.8 | 134 | 180 |
| .95 | 10 | 10.5 | 146 | 147 |
| .96 | 8 | 8.3 | 158 | 116 |
| .97 | 6 | 6.2 | 173 | 87 |
| .98 | 4 | 4.1 | 187 | 57 |
| .99 | 2 | 2 | 196 | 28 |

Sir Humphry Davy's results were somewhat different. He found 100 parts of sp. gr. 0.875, to contain 32.5 of ammonia; of sp. gr. 0.9054, 25.37; and of sp. gr. 0.9692, 9.5 of ammonia.

Water of ammonia decomposes many of the earthy, and all the metalline salts, and is capable of dissolving, or combining with, many of the metalline oxides, and even of oxydizing some of the metals. When pure, water of ammonia does not effervesce with any of the acids, or form a precipitate with alcohol. As it readily absorbs carbonic acid from the atmosphere, the Edinburgh college, very properly, order it to be kept in small phials. By neglecting this precaution in the shops, it often becomes carbonated before the large bottles, in which it is commonly kept, be half done.

*Medical use.*—Water of ammonia is very rarely given internally, although it may be used in doses of ten to twenty drops, largely diluted, as a powerful stimulant in asphyxia, and similar diseases. Externally, it is applied to the skin as a rubefacient, and, in the form of gas, to the nostrils, and to the eyes, as a stimulant; in cases of torpor, paralysis, rheumatism, syncope, hysteria, and chronic ophthalmia.

AQUA AMMONIÆ DILUTA. *Ed.*
*Diluted Water of Ammonia.*

Take of
Water of ammonia, one part;

Distilled water, two parts.
Mix them.

THIS formula for preparing a diluted solution of ammonia is absolutely necessary; for water of mmonia, of the strength obtained by following the direction of the colleges, is perfectly unmanageable, and in fact is never dispensed by the apothecaries, who have always been in the practice of substituting, (and it is well they did so,) for water of ammonia, when prescribed, a form of it diluted according to their own judgment.

ALCOHOL AMMONIATUM. *Ed.*
*Ammoniated Alcohol.*

Take of
Stronger alcohol, thirty-two ounces;
Fresh lime, twelve ounces;
Muriate of lime, eight ounces;
Water, six ounces.

Pour the water on the pounded lime in an iron or earthenware vessel, cover the vessel until the lime fall to powder; then mix the muriate in very fine powder with the lime, by rubbing them together in a mortar, and immediately introduce them into a glass retort. Place the retort in a sand bath, and put on closely a receiver, furnished with a tube which passes to the bottom of a bottle containing the alcohol, but large enough to hold forty-eight ounces.

Lastly, apply heat, to be gradually increased, until the bottom of the iron pot become red, and continue it as long as gas and fluid come over.

SPIRITUS AMMONIÆ. *Dub.*
*Spirit of Ammonia.*

Take of
Proof-spirit, three pints;
Muriate of ammonia, four ounces;
Potashes, six ounces.

Mix, and distil, with a slow fire, two pints.

*Lond.*

Take of
Rectified spirit, two pints.
Liquor of ammonia, one pint.
Mix them.

WHEN muriate of ammonia is decomposed by potashes, the product is a mixture of carbonate of ammonia, with a variable quantity of ammonia. Again, as diluted alcohol is

employed in this process by the Dublin college, and one half only is drawn off, it is evident that there is either a want of economy, or the whole alcohol comes over before any of the water. But if the latter supposition be true, there is also a want of economy, for the alcohol will dissolve only the ammonia, and leave the whole carbonate undissolved. The fact is, that when we perform this process, a very large proportion of carbonate of ammonia sublimes, which remains undissolved in the distilled liquor ; but as this liquor (after the particles of carbonate of ammonia which were diffused through it, have separated in the form of very regular crystals, adhering to the sides of the vessel) effervesces with acids, the distilled liquor cannot be pure alcohol, but must contain a proportion of water capable of dissolving some carbonate of ammonia.

But to prove the want of chemical knowledge in the contrivers of this process, it is only necessary to mention, that the product is unfit for the preparation of the aromatic ammoniated alcohol, as it will not dissolve the volatile oils.

The process now, for the first time, directed by the Edinburgh college, is therefore infinitely preferable, as it is not only more elegant, but more economical, and dissolves the volatile oils perfectly.

The Berlin college direct this preparation to be made by simply mixing two parts of alcohol with one of water of ammonia; and the London college have substituted this process for the unchemical one in their former edition. Mr Phillips objects to the new process, when made with the *liquor ammoniæ* so strong as it was in the Pharmacopœia 1809, its great difference in strength from that of the former Pharmacopœia, while its doses are still stated to be the same. For this error, not the college, but the commentators on its code, have to answer, and if we know the proportionate strength it may be rectified. In the editio altera 1815, the strength is reduced more than one half. Mr Phillips found, that when the spirit of ammonia, as prepared by the process 1809, had a sp. gr. of 0.914, the saturating power of a fluidounce as an alkali was equal to 95 grains of marble, whereas, by the former process, its sp. gr. was 0.845, and its saturating power 32 grains of marble; the former being three times as great as the latter, besides being caustic instead of subcarbonated. He has proposed to substitute another process, which shall be noticed in the remarks upon the Spt. Ammoniæ aromaticus.

SUBCARBONAS AMMONIÆ. *Ed.*
*Carbonate of Ammonia.*

Take of
Muriate of ammonia, one part;
Soft carbonate of lime, dried, two parts.
Having triturated them separately, mix them thoroughly, and sublime from a retort into a refrigerated receiver.

Take of
Muriate of ammonia, in powder, and well dried,
Dried carbonate of soda, of each half a pound.
Mix them, put them into an earthen retort, and sublime, with a heat gradually raised, into a cooled receiver.

AMMONIÆ SUBCARBONAS. *Lond.*
*Subcarbonate of Ammonia.*

Take of
Muriate of ammonia, one pound;
Prepared chalk, dried, one pound and a half.
Triturate them separately, then mix and sublime them with a gradually increased heat, until the retort become red.

IN this process the two substances employed undergo a mutual decomposition, the muriatic acid combining with the lime or the soda, and the carbonic acid with the ammonia. The proportion of carbonate of lime directed by the Edinburgh college is more than sufficient to decompose the muriate of ammonia; but it is the safe side to err on; for it is only inconvenient, from obliging us to make use of larger vessels, and perhaps uneconomical, from requiring more fuel; whereas, if any portion of the muriate of ammonia were to remain undecomposed, it would sublime along with the carbonate, and render the product impure. Mr Phillips says, that 94 of carbonate of lime are sufficient to decompose 100 muriate of ammonia. Göttling uses three parts of chalk to two of muriate of ammonia, but he dries his chalk before he weighs it. The chalk is always to be very carefully dried before it is used in this preparation, as the presence of moisture injures the product. The ingredients are to be thoroughly mixed by trituration, before they are introduced into the retort, that no part of the muriate of ammonia may escape decomposition; and we are even sometimes directed to cover the surface of the mixture, after they are in the retort, with powdered chalk. This, however, is unnecessary. Carbonate of lime does not act on muriate of ammonia till a considerable heat be applied. Göttling says, that the sublimation must be conducted in the

open fire, and therefore he uses an earthenware cucurbit, with a tubulated capital. When a glass retort is employed, it should have a very wide neck; and the best form for the receiver is cylindrical, as it enables us to get out the carbonate of ammonia condensed in it without breaking it. The residuum which remains in the retort furnishes muriate of lime by lixiviation and evaporation.

By the Dublin college, carbonate of soda is employed for the preparation of carbonate of ammonia. The theory of the process is the same, and the decomposition is effected at a lower temperature. But as soda is very rarely saturated with carbonic acid, part of the ammonia is evolved in the form of gas, which, if not permitted to escape, will burst the vessels. To prevent this loss, therefore, Mr Göttling uses a cucurbit and capital, furnished with a bent tube, which is to be immersed in a phial of water: by which contrivance, while the carbonate of ammonia is condensed in the capital, the gaseous ammonia is absorbed by the water. When soda is used, the residuum contains muriate of soda.

Carbonate of ammonia is obtained in the form of a white crystallized mass, of a fibrous texture, having the smell and taste of ammonia, but weaker. It is soluble in twice its weight of cold water; Mr Phillips says four times; its solubility is increased by increase of temperature; but when dissolved in boiling water, it loses a portion of its carbonic acid with effervescence. It is insoluble in alcohol. It is permanent in the air, and is not decomposed, but is easily vaporized by heat. It is said to vary very much in its composition, and to contain more ammonia, and less acid and water, in proportion to the high temperature employed in preparing it; the quantity of alkali varying from 50 to 20 *per cent.* It is decomposed by most of the acids, and all the alkaline, and some of the earthy bases; by the earthy sulphates, except those of baryta and strontia; by the earthy muriates and fluates; by the nitrates of baryta, and superphosphate of lime.

*Medical use.*—Carbonate of ammonia exactly resembles ammonia in its action on the living body; but is weaker, and is principally used as smelling salts in syncope and hysteria.

SOLUTIO SUBCARBONATIS AMMONIÆ. *Ed.*
*Solution of Subcarbonate of Ammonia.*

Take of
Subcarbonate of ammonia, one part;
Distilled water, four parts.

Dissolve the subcarbonate in the water, and filter through paper.

### Liquor ammoniæ subcarbonatis. *Lond.*
*Liquor of Subcarbonate of Ammonia.*

Take of
 Subcarbonate of ammonia, four ounces;
 Distilled water, a pint.

Dissolve the subcarbonate of ammonia in the water, and filter through paper.

### Aqua carbonatis ammoniæ. *Dub.*
*Solution of Carbonate of Ammonia.*

Take of
 Muriate of ammonia, one pound;
 Carbonate of soda, twenty eight ounces;
 Water, three pints.

Distil off by a heat, gradually raised, two pints.

The specific gravity of this liquor is 1095.

The nature of the two first of these preparations is evident; and from its being more simple and uniform, and even economical, it is preferable to the last, for which it is a substitute, as the product in that case is also a solution of carbonate of ammonia, while the residuum in the retort is an alkaline muriate. In this instance, the decomposition of the muriate of ammonia cannot be effected by carbonate of lime, because the addition of the water prevents the application of the necessary heat, whereas alkaline carbonates act at a moderate temperature.

### Liquor volatilis cornu cervini. *Dub.*
*Volatile Liquor of Hartshorn.*

Take of
 Hartshorn, any quantity.

Put it into a retort, and distil, with a gradually increased heat, the volatile liquor, salt, and oil. Then repeat the distillation of the volatile liquor until it becomes as limpid as water, separating by filtration the oil and salt after each distillation. The liquor will be more easily purified, if, after each distillation, except the first, there be added about a sixth part of its weight of charcoal of wood previously heated to redness, then extinguished, by covering it with sand, and powdered while it is hot.

If hartshorn cannot be had, the bones of any other land animal may be substituted for them.

The wholesale dealers have very large pots for this distillation, with earthen heads, almost like those of the common still; for receivers they use a couple of oil jars, the mouths of which are luted together; the pipe that comes from the head is connected by means of an adopter with the lower jar, which is also furnished with a cock for drawing off the fluids condensed in it. The upper jar is entire, and in it is condensed the solid carbonate of ammonia. When a large quantity of the subject is to be distilled, it is customary to continue the operation for several days successively; only unluting the head occasionally, to put in fresh materials. When the upper jar becomes entirely filled with carbonate of ammonia, it cracks. It is then to be removed, the salt to be taken out of it, and a fresh one substituted in its place.

When only a small quantity is wanted, a common iron pot, such as is usually fixed in sand furnaces, may be employed, an iron head being fitted to it. The receiver ought to be large, and a glass, or rather tin adopter inserted between it and the head of the pot.

The distilling vessel being charged with pieces of horn, a moderate fire is applied, which is slowly increased, and raised at length to a very high degree. At first water arises, which gradually acquires colour and smell, from the admixture of empyreumatic oil and ammoniacal salts; carbonate of ammonia next arises, which at first dissolves, as it comes over, in the water, and thus forms what is called the *spirit*. When the water is saturated, the remainder of the salt concretes in a solid form on the sides of the recipient. If it be required to have the whole of the salt solid, and undissolved, the water should be removed as soon as the salt begins to arise, which may be known by the appearance of white fumes; and that this may be done the more commodiously, the receiver should be left unluted, till this first part of the process be finished. The white vapours, which now arise, sometimes come over with such vehemence as to throw off or burst the receiver: to prevent this accident, it is convenient to have a small hole in the luting, which may be occasionally stopt with a wooden peg, or opened, as the operator shall find proper. Lastly, the oil arises, which acquires greater colour and consistency as the operation advances. Carbonate of ammonia still comes over, but it is partly dissolved in the hot oily vapour. At the same time, there is a considerable disengagement of gas, consisting of a mixture of carburetted hydrogen, often containing sulphur and phosphorus, and of carbonic acid.

All the liquid matters being poured out of the receiver, the salt, which remains adhering to its sides, is to be washed out with a little water, and added to the rest. It is convenient to let the whole stand for a few hours, that the oil may the better disengage itself from the liquor, so as to be separated first by a funnel, and afterwards more perfectly, by filtration through wet paper.

None of these products, except perhaps a small quantity of the carbonic acid, exist ready formed in the matter subjected to the distillation, but are produced by a new arrangement of its constituents. For the production of ammonia, it is absolutely necessary that it contain nitrogen, or be what we have called a quaternary oxide. Although some vegetable, and most animal, substances are of this kind, yet only the most solid parts of animals, such as bone or horn, are employed for the production of ammonia; because they furnish it less mixed with other substances, are easily obtained and at little expence, and are very manageable in the distillation. On the application of heat, as soon as all the water which they contained is expelled, their elements begin to act on each other, and to form binary, or at most ternary compounds. Water is formed of part of the oxygen and hydrogen, ammonia of nitrogen and hydrogen, carbonic acid of carbon and oxygen, then oil of hydrogen and carbon, while the superfluous carbon remains in the retort in the state of charcoal. As the formation of these substances is simultaneous, or in immediate succession, they are not obtained separately, but are mixed with each other. The water is saturated with carbonate of ammonia, and impregnated with empyreumatic oil, while the carbonate of ammonia is discoloured with oil; and the oil contains carbonate of ammonia dissolved in it. They may, however, be separated from each other, in a great measure, in the manner already described. But a small portion of oil obstinately adheres both to the salt and its solution, which constitutes the only difference between salt and spirit of hartshorn, as they are called, and the purer carbonate of ammonia, as obtained by the decomposition of muriate of ammonia.

### AQUA ACETATIS AMMONIÆ. *Ed.*
### *Water of Acetate of Ammonia.*

Take of [illegible]monia in powder, any quantity;
 [illegible] acid, a sufficient quantity.

Add the acid gradually, until the subcarbonate is accurately saturated.

*Dub.*

Take of

Carbonate of ammonia, two ounces.

Add gradually, with frequent agitation, three pounds and a half of distilled vinegar, or as much as will saturate the ammonia, as proved by the test of litmus.

LIQUOR AMMONIÆ ACETATIS. *Lond.*
*Solution of Acetate of Ammonia.*

Take of

Carbonate of ammonia, two ounces;

Acetic acid, four pints.

Add the acid to the carbonate of ammonia until the effervescence cease, and mix.

THE exact point of saturation should be ascertained by the alternate use of litmus and turmeric papers.

By this process, we obtain acetate of ammonia, dissolved in the water of the acetic acid; but as this is apt to vary in quantity, the solution also varies in strength, and the crystallization of the salt is attended with too much difficulty to be practised for pharmaceutical purposes. Its crystals are long, slender, and flatted, of a pearly white colour, and of a cool sweetish taste, are very deliquescent, melt at 170°, and sublime at 250°. It is decomposed by the acids, alkalies, and several of the earths, and metalline salts; and when in solution, its acid is decomposed spontaneously, and by heat. It is also decomposed by a solution of superacetate of lead. This was suspected to be owing to the vinegar employed being contaminated with sulphuric acid; but Mr Phillips has proved, that it arises from some of the carbonic acid remaining diffused through the solution.

Different proposals have been made to get a solution of greater strength and uniformity than that still retained by the British colleges. Mr Lowe saturates four ounces of carbonate of potass with distilled vinegar, and evaporates the solution to 36 ounces. He then mixes it with two ounces of muriate of ammonia, and distils the mixture in a glass retort. Acetate of ammonia comes over. The last edition of the Prussian Pharmacopœia prepares it by saturating three ounces of carbonate of ammonia with a strong acetic acid (obtained by [illegible]tion from acetate of soda, dissolved in two parts of water, and dec[illegible] by sulphuric acid,) and diluting the solution with water, so that it [illegible] twenty-four ounces. One ounce, therefore, contains the alk[illegible] of carbonate of ammonia.

*Medical use.*—Acetate of ammonia, when assisted by a warm regimen, proves an excellent and powerful sudorific; and as

it operates without quickening the circulation, or increasing the heat of the body, it is admissible in febrile and inflammatory diseases, in which the use of stimulating sudorifics are attended with danger. Its action may likewise be determined to the kidneys, by walking about in a cool air. The common dose is half an ounce, either by itself or in combination with other substances.

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## Chap. IV.—EARTHS and EARTHY SALTS.

### Murias barytæ. *Ed.*
### *Muriate of Baryta.*

Take of
Carbonate of baryta,
Muriatic acid, of each one part;
Water, three parts.

Add the carbonate, broken into little bits, to the water and acid, previously mixed. After the effervescence has ceased, digest for an hour, strain the liquor, and, after due evaporation, set it aside to crystallize. Repeat the evaporation as long as any crystals are formed.

If the carbonate of baryta cannot be procured, the muriate may be prepared in the following manner from the sulphate:

Take of
Sulphate of baryta, two pounds;
Charcoal of wood, in powder, four ounces;
Muriatic acid, a sufficient quantity.

Roast the sulphate, that it may be more easily reduced to a very fine powder, with which the powdered charcoal is to be intimately mixed. Put the mixture into a crucible, and having fitted it with a cover, heat it with a strong fire for six hours. Then triturate the matter well, and throw it into six pounds of water in an earthen or glass vessel, and mix them by agitation, preventing as much as possible the action of the air.

Let the vessel stand in a vapour bath until the part not dissolved shall subside, then pour off the liquor. On the undissolved part pour four pounds more of boiling water,

which, after agitation and deposition, are to be added to the former liquor. Into the liquor, when still warm, or if it shall have cooled, again heated, drop muriatic acid as long as it excites any effervescence. Then strain the liquor, and evaporate it so as to crystallize.

In the materia medica of the Edinburgh college, the carbonate of baryta is introduced, for the purpose of forming the muriate; but as that mineral is not very common, and sometimes not to be procured, it became necessary to describe the manner of preparing the muriate from the sulphate. This is, however, attended with very considerable difficulties, on account of the very strong attraction which subsists between the sulphuric acid and baryta.

The sulphate of baryta may be decomposed,

1. By compound affinity, by means of carbonate of potass or muriate of lime.

Carbonate of potass is capable of effecting this decomposition, either in the dry or humid way. Klaproth boils sixteen ounces of finely powdered sulphate of baryta with 32 ounces of purified carbonate of potass, and five pounds of water, for an hour in a tin-kettle, constantly agitating the mixture, and renewing the water as it evaporates. He then allows it to settle, pours off the fluid, which is a solution of sulphate of potass, and edulcorates the precipitate with plenty of water. He next dissolves the carbonate of baryta, which it contains, in muriatic acid. The portion of sulphate which is not decomposed may be treated again in the same manner.

On the other hand, Van Mons mixes equal parts of sulphate of baryta and carbonate of potass with one-fourth of their weight of charcoal, all in powder, and heats the mixture to redness in a crucible. When it cools, he washes out the sulphate and sulphuret of potass, with water, then boils the residuum with a little potass, and washes it again. The carbonate of baryta thus obtained he dissolves in muriatic acid.

But by these methods of decomposing the sulphate of baryta, we do not get rid of the metallic substances which it often contains, and which render the muriate thus prepared unfit for medical use. The metalline muriates may, however, be expelled, according to Westrumb, by heating the salt to redness as long as any fumes arise. The pure muriate of baryta is then to be dissolved in water, and crystallized. Göttling, with the same intention, of getting rid of metalline substances, chooses sulphate of baryta, perfectly colourless, and treats it with muriatic or nitro-muriatic acid before he proceeds to decompose it.

La Grange has proposed a new method of decomposing the sulphate of baryta, by means of muriate of lime, which he prepares from the residuum of the decomposition of muriate of ammonia by lime, by dissolving it in a small quantity of hot water, and evaporating it to dryness. He mixes equal parts of this muriate with sulphate of baryta in powder, and projects it by spoonfuls into a crucible previously heated to redness. When it is all in complete fusion, he pours it out upon a polished stone previously heated. The matter, which cracks as it cools, has a whitish-grey colour, and is very hard, sonorous, and deliquescent, is now to be boiled in about six times its weight of distilled water, its solution filtered, and the residuum boiled in a smaller quantity of water. The mixed solutions are then evaporated to a pellicle, and on cooling furnish beautiful crystals of muriate of baryta, which are to be washed with cold water, and purified by a second solution and crystallization. The mother water of the first crystallization still contains muriate of baryta, which may be separated from the muriate of lime, with which it is mixed, by repeated solutions and crystallizations. La Grange thinks that this process not only saves time, fuel, and muriatic acid, but that it furnishes a purer muriate of baryta than the following process.

2. By decomposing its acid, by means of charcoal.

The acid of the sulphate of baryta is decomposed at a very high temperature by charcoal. At such a temperature charcoal has a greater affinity for oxygen than sulphur has; it therefore decomposes the sulphuric acid, by depriving it of its oxygen, and flies off in the state of carbonic oxide or acid gas, while the sulphur combines with the baryta. On adding water to the sulphuret thus formed, new combinations take place. A portion of sulphate of baryta is regenerated, while hydroguretted sulphuret, and sulphuretted hydroguret of baryta, remain in solution. This solution is exceedingly prone to decomposition, and must, therefore, be preserved from the action of the air as much as possible. It also crystallizes by cooling, and therefore should be kept at a boiling heat. On the addition of muriatic acid, there is a violent effervescence and disengagement of sulphuretted hydrogen gas, which must be avoided as much as possible, by performing the operation under a chimney, while very pure muriate of baryta remains in solution. When prepared in this way, it cannot be contaminated with any of the noxious metals, as their compounds with sulphur and hydrogen are not soluble. On this account,

therefore, it is the process adopted by the Edinburgh college.

Muriate of baryta commonly crystallizes in tables. It has a disagreeable bitter taste; is soluble in three parts of water at 60°, and in less boiling water. It is scarcely soluble in alcohol; and its solution burns with a yellow flame. It crystallizes by evaporation; its crystals are permanent; and by the action of heat decrepitate, dry, and melt. For making a solution, the crystals should be used entire; for when previously powdered, it always turns out turbid. When crystallized, it contains about 20 acid, 64 baryta, and 16 water; when dried, 23.8 acid, and 76.2 baryta. It is decomposed by the sulphates, nitrates, succinates, oxalates, tartrates, and sulphites; and by the alkaline phosphates, borates, and carbonates, and their acids. It is also decomposed by succinate of ammonia, nitrate of silver, acetate, nitrate and phosphate of mercury, acetate of lead, tartrates of iron and antimony, burnt sponge, and Hermbstadt's antimonial tincture, antimonial wine, soap, &c., extracts of gentian, marsh trefoil, and the inspissated juices of aconite, hemlock and hyoscyamus.

It is not decomposed by muriate of iron, or corrosive sublimate, and bears the addition of aromatic distilled waters, simple syrups, gum arabic mucilage, some simple extracts, pure opium, and similar substances, when they do not contain astringent matter. When pure it has no colour; does not deliquesce; does not burn with a red or purple flame, when dissolved in alcohol; and is not precipitated by gallic acid, prussiate of potass and iron, or hydro-sulphuret of ammonia. By washing with alcohol muriate of baryta, rendered impure by the presence of muriate of iron, the latter alone is dissolved.

It is commonly given in solution.

### Solutio muriatis barytæ. *Ed.*
### *Solution of Muriate of Baryta.*

Take of

Muriate of baryta, one part;

Distilled water, three parts. Dissolve.

The proportion of water directed here for the solution of muriate of baryta is considerably less than what is stated to be necessary by the writers on chemistry. It is, however, sufficient, even at the lowest ordinary temperatures; a circumstance which should be attended to in making saturated solutions of saline bodies.

*Medical use.*—Muriate of baryta is generally said, by writers on the materia medica, to be a *stimulant* deobstruent; and

yet Hufeland, one of its greatest supporters, says, that it succeeds better in cases attended with inflammation and increased irritability than with atony and torpor. When given in large doses, it certainly produces nausea, vomiting, diarrhœa, vertigo, and death.

Its effects on a morbid state of the body are also disputed. Some assert that it is of advantage in no disease; while others bestow upon it the most unqualified praises. By the latter, is is principally celebrated,

1. In all cases of scrofula;
2. In obstructions and tumours;
3. In cases of worms;
4. In cutaneous diseases.

The dose of the solution, at first, is five or ten drops twice or thrice a day, to be gradually and cautiously increased to as much as the patient can bear.

The solution is also used externally as a stimulating and gently escharotic application in cutaneous diseases, fungous ulcers and specks upon the cornea.

### CALX. *Lond.*
### *Lime.*

Take of
  Limestone, one pound.

Break it into bits, and burn it for an hour in a crucible with a violent heat, or until the carbonic acid be totally expelled, so that on dropping on it acetic acid, no air bubbles are formed.

Lime may be made in the same manner from *oyster-shells*, after they have been washed in boiling water, and freed from all impurities.

LIME is not found in nature, but it is easily procured by the action of fire from any of the abundant carbonates, mineral or animal. For most purposes common lime will do; but as it is seldom totally deprived of its carbonic acid, it may be necessary for the apothecary to prepare it himself. Clean oyster-shells afford it in the greatest purity; and as pure lime is not altered by any heat that can be applied, there is no risk of pushing the fire too far. Marble, and many lime-stones, also furnish a very pure lime; but those which contain a mixture of other earths are apt to become vitrified on the surface, which prevents them from slaking.

SOLUTIO CALCIS sive AQUA CALCIS. *Ed.*
*Solution of Lime* or *Lime Water.*

Take of
Fresh burnt lime, half a pound.
Put it into an earthen vessel, and sprinkle on it four ounces of water, keeping the vessel covered, while the lime grows hot, and falls into powder. Then pour on it twelve pounds of water, and mix the lime thoroughly with the water by agitation. After the lime has subsided, repeat the agitation, and let this be done about ten times, always keeping the vessel covered, that the free access of the air may be prevented. Lastly, let the water be filtered through paper, with glass rods interposed between it and the funnel, that the solution may pass as quickly as possible. It must be kept in very close bottles.

AQUA CALCIS. *Dub.*
*Lime Water.*

Take of
Lime recently burnt, one pound;
Boiling water, one pint.
Put the lime into an earthen vessel, and sprinkle the water upon it, keeping the vessel shut while the lime grows warm and falls into powder; then pour upon it three gallons of cold water, and close the vessel, agitating it frequently for twenty-four hours; lastly, filter the water through paper, placed in a covered funnel, and keep it in well-closed bottles.

LIQUOR CALCIS. *Lond.*
*Solution of Lime.*

Take of
Lime, half a pound;
Boiling distilled water, twelve pints.
Pour the water on the lime, and stir them together; immediately cover the vessel, and set it aside for three hours; then preserve the liquor upon the remaining lime in well-corked bottles, and decant off the limpid solution when wanted for use.

WE have already had occasion to speak of the properties of lime, and shall therefore now confine our remarks to the solution of it in water, commonly called Lime-water. In making this, we should first add only so much water as is sufficient to slake the lime, which reduces it to a fine powder, easily diffused through water; for if we add more water at first, it forms a paste with the external part of the l

defends the internal from the action of the water. During the whole process, the air must be excluded as much as possible, as lime has a very strong affinity for carbonic acid, and attracts it from the atmosphere. The proportion of water used is scarcely able to dissolve one-tenth of the lime; but lime is of little value; and our object is to form a saturated solution quickly and easily. Lime is actually more soluble in cold water than in hot: therefore it is unnecessary to use boiling water. The Edinburgh and Dublin colleges filter their solutions; and if we use the precautions directed, it may be performed without the lime absorbing a perceptible quantity of carbonic acid. The bottles in which lime-water is kept should be perfectly full, and well corked.

The London college do not filter, but decant off their solution, and if carefully performed it will be perfectly pure; and the directions given by them, in their last edition, of keeping their lime-water upon an excess of lime, is certainly an advantage, as we are sure of its being always saturated, for fresh lime will be always dissolved to supply the place of that rendered insoluble, and precipitated by the absorption of carbonic acid.

Lime-water is transparent and colourless. It has an austere acrid taste, and affects vegetable colours as the alkalies do. Good lime-water is precipitated white by alkaline carbonates, and orange by corrosive sublimate. It enters very readily into combination with all the acids, sulphur, and phosphorus, and decomposes the alkaline carbonates, phosphates, fluates, borates, oxalates, tartrates, and citrates, the ammoniacal acetates, muriates and succinates, the sulphates of alumina and magnesia, the metallic salts, spiritous liquors, and astringent substances.

*Medical use.*—When applied to the living fibre, lime-water corrugates and shortens it; it therefore possesses astringent powers. It is also a powerful antacid, or at least it combines with, and neutralizes acids when it comes in contact with them. It also dissolves mucus, and kills intestinal worms. From possessing these properties, it is used in medicine, in diseases supposed to arise from laxity and debility of the solids, as diarrhœa, diabetes, leucorrhœa, scrofula, and scurvy; in affections of the stomach accompanied with acidity and flatulence; when the intestines are loaded with mucus; and in worms. Lime-water is scarcely capable of dissolving, even out of the body, any of the substances of which urinary calculi consist; it has therefore no pretensions to the character of a lithontriptic. It has been also recommended in crusta lactea, in cancer, and in chronic cutaneous diseases. Exter-

nally, it is applied to ill-conditioned ulcers, gangrenous sores; as a wash in tinea capitis and psora; and as an injection in gonorrhœa, fistulas, and ulcers of the bladder.

When taken internally, its taste is best covered by luke-warm milk. Its dose is commonly from two to four ounces, frequently repeated; but when long continued, it weakens the organs of digestion.

### CARBONAS CALCIS PRÆPARATUS. *Ed.*
*Prepared Carbonate of Lime.*

Carbonate of lime, after having been triturated to powder in an iron mortar, and levigated on a porphyry stone with a little water, is to be put into a large vessel, and water to be poured upon it, which, after agitating the vessel repeatedly, is to be decanted off, while loaded with minute powder. On allowing the water to settle, the subtile powder will subside, which is to be dried.

The coarse powder which the water could not suspend, may be levigated again, and treated in the same manner.

### CRETA PRÆPARATA. *Lond.*
*Prepared Chalk.*

Take of

Chalk, one pound.

Add a little water to the chalk, and triturate it to fine powder. Throw this into a large vessel filled with water, then agitate them, and after a short pause, decant off the supernatant liquid, still turbid, into another vessel, and set it aside, that the powder may subside. Lastly, having poured off the water, dry this powder.

### TESTÆ PRÆPARATÆ. *Lond.*
*Prepared Oyster Shells.*

Wash the shells, previously well cleansed, in boiling water, then prepare them in the same manner as chalk is prepared.

### CRETA PRÆPARATA. *Dub.*
*Prepared Chalk.*

Grind it to powder in an earthen-ware mortar, with the addition of a little water; then mix it with a sufficient quantity of water by agitation; and after allowing it to stand a little, until the coarser particles fall to the bottom, pour off the liquor. This may be frequently repeated, triturating previously each time. Finally, the very fine powder, which,

after some time, will subside in the decanted liquor, is to be collected and dried upon a bibulous stone or paper.

OSTREARUM TESTÆ PRÆPARATÆ, *D.* *Prepared Oyster Shells,*
OVORUM TESTÆ PRÆPARATÆ, *D.* *Prepared Egg Shells,*
Are to be prepared in the same manner as chalk.

THE preparation of these substances merely consists in reducing them to an impalpable powder.

*Medical use.*—Carbonate of lime is commonly called an absorbent earth. It certainly is an antacid; that is, it combines with and neutralizes most acids, while its carbonic acid is expelled in the form of gas. It is therefore exhibited in affections of the stomach accompanied with acidity, especially when at the same time there is a tendency to diarrhœa. The fear of its forming concretions in the bowels, is probably imaginary; for it is not warranted either by theory or experience.

Applied externally, carbonate of lime may be considered as an absorbent in another point of view; for its beneficial action on burns and ulcers probably arises entirely from its imbibing the moisture or ichorous matter, as a sponge would do, and thus preventing it from acting on the abraded surfaces, and excoriating the neighbouring parts.

CRETA PRÆCIPITATA. *Dub.*
*Precipitated Chalk.*

Take of
Water of muriate of lime, any quantity.
Add as much carbonate of soda, dissolved in four times its weight of distilled warm water, as is sufficient to precipitate the chalk. Wash the matter which falls to the bottom, three times, by pouring on, each time, a sufficient quantity of water. Lastly, having collected it, dry it upon a chalk stone or paper.

THIS preparation affords carbonate of lime in its purest state, and, although expensive, may be employed when it is intended for internal use.

CALCIS MURIAS. *Lond.*
*Muriate of Lime.*

Take of
The salt which remains after the distillation of the subcarbonate of ammonia, two pounds;
Water, one pint.
Dissolve and filter through paper. Evaporate the liquor

until the salt be rendered dry. Keep this in a well-closed phial.

LIQUOR CALCIS MURIATIS. *Lond.*
*Liquor of Muriate of Lime.*

Take of
Muriate of lime, two ounces;
Distilled water, three fluidounces.
Dissolve the muriate of lime in the water, then filter through paper.

SOLUTIO MURIATIS CALCIS. *Ed.*
*Solution of Muriate of Lime.*

Take of
Hard carbonate of lime, that is, white marble, broken into pieces, nine ounces;
Muriatic acid, sixteen ounces;
Water, eight ounces.
Mix the acid with the water, and gradually add the pieces of carbonate of lime. When the effervescence has ceased, digest them for an hour, pour off the liquor and evaporate it to dryness. Dissolve the residuum in its weight and a half of water, and, lastly, filter the solution.

AQUA MURIATIS CALCIS. *Dub.*
*Water of Muriate of Lime.*

Take of
Chalk, in coarse powder, one ounce;
Diluted muriatic acid, two ounces.
Gradually add the chalk to the acid, and, after the effervescence is finished, filter.

FROM the difficulty of crystallizing this salt, it is directed by the Edinburgh college to be evaporated to the total expulsion of its water of crystallization, as being the surest way of obtaining a solution of uniform strength. With the same view, the Dublin College saturate muriatic acid of a given strength; and Dr Wood directs, that the solution should always have a determinate specific gravity. It may be economically prepared from the residuum in the decomposition of muriate of ammonia, by lime or chalk, according to the directions of the Berlin Pharmacopœia, now adopted by the London college, by watery fusion, solution, filtration, and crystallization. Its purity is ascertained by its remaining colourless and transparent, with infusion of galls and caustic ammonia; a brown colour indicating the presence of iron, and a precipitation that of alumina. But it may be purified by boil-

ing it in solution an hour, with a sufficient quantity of pure chalk, or other carbonate of lime, filtrating it, evaporating it gently, till it acquire the specific gravity of 1.5, allowing it to stand some days in a corked bottle, decanting it carefully from the sediment, and duly evaporating it.

The crystals of this salt are prisms of six smooth and equal sides, but they are often so aggregated, that they can only be termed acicular. Its taste is pungent, bitter, and disagreeable. When heated, it melts, swells, and loses its water of crystallization. It is one of the most deliquescent salts known, and is so soluble, that water seems capable of dissolving twice its weight, or, at least, forms with it a viscid liquor; but as it is still capable of attracting moisture from the air, and of emitting caloric, when farther diluted, it can scarcely be considered as a true solution. Dörfurt says, it is perfectly soluble in one and a half cold water, and in much less than its own weight of boiling water. It is also soluble in an equal weight of boiling alcohol, and its solution burns with a crimson flame. It is decomposed by the sulphuric, nitric, oxalic, tartaric, succinic, phosphoric, fluoric, and boracic acids; by baryta, potass, soda, and strontia; by carbonated, sulphated, phosphated, tartarated, acetated alkalies; superoxalate of potass, sub-borate of soda, boro-tartrate of potass and soda, tartrate of potass and soda, succinate of ammonia, alum, sulphate of magnesia, nitrate of silver, nitrate, phosphate, and acetate of mercury, acetate of lead, and sulphate of iron, copper and zinc. Crystallized, it contains, according to Bergman, 31 acid, 44 lime, and 25 water; dried at a red heat, 42 acid, 50 lime, and 8 water.

*Medical use.*—It was first proposed as a medicine by Fourcroy, and has been lately extolled in scrofulous and glandular diseases, and cases of debility in general, by several eminent practitioners of our own country, Dr Beddoes, Dr R. Pearson, and Dr Wood. Thirty drops of the solution are a sufficient dose for children, and a drachm for adults, repeated twice or thrice a-day. In an over-dose, it has produced qualms and sickness; and three drachms and a half killed a dog, the stomach of which, upon dissection, had its villous coat bloodshot, and in many parts almost black and converted into a gelatinous slime. Perhaps it is the muriate of lime which is the active ingredient in the lotions prepared by triturating calomel or corrosive sublimate in lime water. The compound resulting is a solution of muriate of lime, with oxide of mercury diffused through it. The property of this salt, of producing intense cold during its solution, might also be

applied to medical use; and its strong affinity for water and alcohol fits it for the rectification of alcohol and ether.

### Cornu ustum. *Lond.*
### *Burnt Horn.*

Burn pieces of horn in the open fire, until they become perfectly white; then reduce them to powder, and prepare it in the same manner as is directed for chalk.

### Pulvis cornu cervini usti. *Dub.*
### *Powder of Burnt Hartshorn.*

Burn pieces of hartshorn till they become perfectly white; then reduce them to a very fine powder.

The pieces of horn generally employed in this operation are those left after distillation.

In the burning of hartshorn, a sufficient fire, and the free admission of air are necessary. The potter's furnace was formerly directed, for the sake of convenience; but any common furnace or stove will do. Indeed, too violent a heat makes their surface undergo a kind of fusion and vitrification, which both prevents the internal parts from being completely burnt, and renders the whole less soluble. If the pieces of horn be laid on some lighted charcoal, spread on the bottom of the grate, they will be burnt to whiteness, still retaining their original form.

According to the analysis of Merat Guillot, hartshorn consists of 27. gelatine, 57.5 phosphate of lime, 1. carbonate of lime, and there was a loss of 14.5, probably water. Now, as the gelatine is destroyed by burning, and the water expelled, the substance which remains is phosphate of lime, mixed with less than two *per cent.* of carbonate of lime. Fourcroy and Vauquelin have analysed bones more accurately, and found that they contain phosphate of magnesia, iron, and manganese, and that human bones contain less of the first of these, and more of the two others than animal bones, which is probably owing to the constant excretion of phosphate of magnesia in human urine. In human bones there are also traces of alumine and silex.

*Medical use.*—From its white earthy appearance, it was formerly considered as an absorbent earth. But since it has been accurately analysed, that idea has been laid aside, and its use has been suggested as a remedy in rickets, a disease in which the deficiency of the natural deposition of phosphate of lime in the bones seems to be the essential, or, at least, the most striking symptom. Mr Bonhomme, therefore, gave it to

the extent of half a scruple, mixed with phosphate of soda, in several cases with apparent success. Whatever objections may be made to this theory, the practice certainly deserves a trial.

### MAGNESIA. *Ed.*
*Magnesia.*

Let carbonate of magnesia, put into a crucible, be kept in a red heat for two hours; then put it up in close-stopt glass vessels.

*Lond.*

Take of
 Carbonate of magnesia, four ounces.
Burn it with a very fierce fire for two hours, or until acetic acid dropped upon it cause no effervescence.

### MAGNESIA USTA. *Dub.*
*Calcined Magnesia.*

Take of
 Magnesia, any quantity.
Expose it to a strong heat in a crucible, for two hours; and, when cold, put it into a glass vessel.

By this process the carbonate of magnesia is freed of its acid and water; and, according to the late Dr Black's experiments, loses about $\frac{7}{12}$ of its weight. A kind of opaque, foggy vapour is observed to escape during the calcination, which is nothing else than a quantity of fine particles of magnesia, buoyed off along with a stream of the disengaged gas. About the end of the operation, the magnesia exhibits a kind of luminous or phosphorescent property, which may be considered as a pretty exact criterion of its being deprived of its acid.

It is to be kept in close vessels, because it attracts, though slowly, the carbonic acid of the atmosphere. Its sp. gr. is 2.33, and when sprinkled with water, heat is produced, and it absorbs 18 *per cent.* Magnesia decomposes alum, borax, tartrate and succinate of ammonia, tartrate of potass, tartrate of potass and soda, and all the officinal metallic salts.

*Medical use.*—It is used for the same general purposes as the carbonate. In certain affections of the stomach, accompanied with much flatulence, magnesia is preferable, both because it contains more magnesia in a given bulk, and, being deprived of its acid, it neutralizes the acid of the stomach, without any extrication of gas, which is often a troublesome consequence when carbonate of magnesia is employed in these complaints.

CARBONAS MAGNESIÆ. *Ed.*
*Carbonate of Magnesia.*

Take of
Sulphate of magnesia, four parts;
Subcarbonate of potass, three parts;
Boiling water, a sufficient quantity.

Dissolve the salts separately in twice their weight of the water, and let the liquors be strained, or otherwise freed from their fæces; then mix them, and instantly add eight times their weight of boiling water. Let the liquor boil for a little on the fire, stirring it at the same time; then let it rest till the heat be somewhat diminished; after which strain it through linen: the carbonate of magnesia will remain upon the cloth, and is to be well washed with pure water, and afterwards dried with a gentle heat.

*Lond.*

Take of
Sulphate of magnesia, one pound;
Subcarbonate of potass, nine ounces;
Water, three gallons.

Dissolve separately the subcarbonate in three pints of the water, and the sulphate in five, and filter. Then add the rest of the water to the solution of the sulphate; boil it, and, while it is boiling, mix with it, under constant stirring, the solution of the subcarbonate, and filter through linen. Lastly, wash the powder with repeated affusions of boiling water, and dry upon blotting paper, with a heat of 200°.

MAGNESIA. *Dub.*
*Magnesia.*

Take of
Sulphate of magnesia,
Subcarbonate of kali, of each two pounds;
Boiling water, twenty pints.

Dissolve the sulphate of magnesia and the kali, each in ten pounds of water. Mix the defæcated liquors. Boil the mixture a little, and, while still warm, filter it through linen, stretched, so as to fit it for collecting the magnesia. Wash off the sulphate of kali, by repeated affusions of boiling water; and, lastly, dry the magnesia.

IN this process, there is a mutual decomposition of the two salts employed. The potass unites itself to the sulphuric acid, while the carbonic acid combines with the magnesia, to form subcarbonate of magnesia. The large quantity of water used is necessary for the solution of the sulphate of potass

formed; and the boiling is indispensably requisite for the expulsion of a portion of the carbonic acid, which is furnished in excess by the alkali, and would otherwise retain a part of the magnesia in solution: 100 parts of crystallized carbonate of potass are sufficient for the decomposition of 125 parts of sulphate of magnesia; and, from these quantities, about 45 parts of carbonate of magnesia are obtained. Mr Phillips says, that 3 of the alkaline salts are sufficient to decompose 4 of the sulphate of magnesia: his proportions have been adopted by the London college.

The ablutions should be made with very pure water; for nicer purposes distilled water may be used; and soft water is, in every case, necessary. Hard water, for this process, is peculiarly inadmissible, as the principle in waters, giving the property called *hardness*, is generally a salt of lime, which decomposes the carbonate of magnesia, by compound affinity, giving rise to carbonate of lime, while the magnesia unites itself to the acid of the calcareous salt, by which the quantity of the carbonate is not only lessened, but is rendered impure by the admixture of carbonate of lime. Another source of impurity is the silica, which the subcarbonate of potass generally contains. It is most easily got rid of by exposing the alkaline solution to the air for several days before it is used. In proportion as it becomes saturated with carbonic acid, the silica is precipitated, and may be separated by filtration.

In the preparation of the subcarbonate of magnesia, the Berlin college order subcarbonate of soda to be used, which has the advantage of forming with the sulphuric acid of the sulphate of magnesia a much more soluble salt than the sulphate of potass, and the magnesian precipitate is said to turn out lighter and whiter, the less water there is employed in its preparation. The carbonate of magnesia of commerce is prepared from the muriate of magnesia, which remains in solution after the crystallization of muriate of soda from sea-water.

The carbonate of magnesia, thus prepared, is a very light, white, opaque substance, without smell or taste, effervescing with acids. It is not, however, saturated with carbonic acid. By decomposing sulphate of magnesia by an alkaline carbonate, without the application of heat, carbonate of magnesia is gradually deposited in transparent, brilliant, he[illegible] crystallized tals terminated by an oblique hex[illegible] of 50 acid, 25 magnesia, and in about 480 times th[illegible] subcarbonate requires at least 850 times its carbonat[illegible]

weight of water for its solution, and consists of 48 acid, 40 magnesia, and 12 water; and that of commerce, of 34 acid, 45 magnesia, and 21 water. It is decomposed by all the acids, potass, soda, baryta, lime, and strontia, the sulphate, phosphate, nitrate, and muriate of alumina, and the superphosphate of lime.

A solution of supercarbonate of magnesia, prepared in imitation of the supercarbonate of soda, has been lately introduced into commerce by Mr Murray, a surgeon of Belfast, which answers very well the purposes for which it is adapted.

*Medical use.*—Carbonate of magnesia is principally given to correct acidity of the stomach, and, in these cases, to act as a purgative; for solutions of magnesia in all acids are bitter and purgative; while those of the other earths are more or less austere and astringent. A large dose of magnesia, if the stomach contain no acid to dissolve it, neither purges nor produces any sensible effect; a moderate one, if an acid be lodged there, or if acid liquors be taken after it, procures several stools; whereas the common absorbents, in the same circumstances, instead of loosening, bind the belly. When the carbonate of magnesia meets with an acid in the stomach, there is extricated a considerable quantity of carbonic acid gas, which sometimes causes uneasy distention of the stomach, and the symptoms of flatulence. In such cases, therefore, magnesia is preferable to its carbonate; but, on other occasions, as in nausea and vomiting, good effects arise from the action of the gas evolved.

### ALUMEN EXSICCATUM. *Ed.*
### *Dried Alum.*

Melt alum in an earthen or iron vessel, and keep it over the fire until it cease to boil. Then powder it.

### ALUMEN EXSICCATUM. *Lond.*
### *Dried Alum.*

Melt alum in an earthen pot over the fire, which is to be increased until the ebullition cease.

### ALUMEN USTUM. *Dub.*
### *Burnt Alum.*

Take of

to [illegible] quantity.

THE vessel in which this proc[illegible] vessel to a strong fire, until it cease

tain at least three times as much as the alum [illegible] must con-

this swells exceedingly in melting, and would otherwise run over.

Mr Chaptal found, that by exsiccation in a red heat, alum of his own manufacture lost 0.67, Roman alum 0.50, English alum 0.47, and Levant alum only 0.40. These differences arise principally from different proportions of water of crystallization, but also from an excess of alumina, which the last contains.

According to Kirwan, crystallized alum consists of 17.66 acid, 12 alumina, and 70.24 water, and alum desiccated at 700°, of 36.25 acid, and 63.75 basis, by which it would appear, that at that heat it loses not only all its water, but also more than half its acid.

Dried alum is only applied externally, as a gentle escharotic to fungous ulcers.

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## Chap. V.—METALLINE PREPARATIONS.

### ANTIMONY.

#### Sulphuretum antimonii præparatum. *Ed.*
*Prepared Sulphuret of Antimony.*

Powder sulphuret of antimony in an iron mortar, levigate it upon a porphyry stone with a little water, and put it into a large vessel: Then pour upon it water which is to be decanted off loaded with the fine powder, by frequently agitating the vessel. On allowing the water to settle, the powder will subside, and is then to be dried.

The coarse powder, which the water could not suspend, is to be again levigated and treated in the same way.

*Dub.*

Reduce it to powder, and separate for use the impalpable particles, in the manner directed for the preparation of chalk.

By reducing the sulphuret of antimony to the state of an impalpable powder, it is both rendered much more active, and is prevented from irritating the stomach mechanically, of which there would be some danger, from the sharpness of its spiculæ. Even in this state, however, it is not a very certain

remedy. In general, it operates as a mild sudorific or cathartic; but sometimes, if it meet with much acid in the stomach, it becomes more active, producing vomiting and hypercatharsis. Therefore, it seems prudent to evacuate the primæ viæ before it be exhibited, and to combine it with an absorbent earth.

It is principally given in scrofula, glandular obstructions, cutaneous diseases, and rheumatism. Its dose is from 10 to 30 grains, and upwards; and it is best exhibited in the form of a powder or bolus. It seems to constitute a quack remedy which has acquired some reputation in Ireland for the cure of cancer. It is used externally for dressing the sore.

### Sulphuretum antimonii præcipitatum. *Ed.*
*Precipitated Sulphuret of Antimony.*

Take of
- Water of potass, four pounds;
- Water, three pounds;
- Prepared sulphuret of antimony, two pounds;
- Dilute sulphuric acid, a sufficient quantity.

Mix the sulphuret with the solution of potass and the water, then boil them in a covered iron pot, over a slow fire, for three hours, adding more water, if necessary, and frequently stirring the mixture with an iron spatula; strain the liquor, while warm, through a double linen cloth, and add to it, when filtered, as much of the acid as is necessary to precipitate the sulphuret, which must be well washed with warm water.

*Lond.*

Take of
- Sulphuret of antimony, in powder, two pounds;
- Solution of potass, four pints;
- Distilled water, three pints.

Mix and boil, with a gentle fire, for three hours, constantly stirring, and adding, from time to time, as much distilled water as to keep up the original quantity. Quickly filter the solution through double linen, and gradually drop into it, when still hot, as much diluted sulphuric acid as may precipitate it; then wash away the sulphate of potass with warm water; dry the precipitated sulphuret of antimony and triturate it to powder.

SULPHUR ANTIMONIATUM FUSCUM. *Dub.*
*Brown Antimoniated Sulphur.*

Take of
Prepared sulphuret of antimony,
Subcarbonate of kali, each one ounce.

Melt them, previously mixed, in a crucible. Powder the mass, when cold. Put it into a matrass, with four pints of water, and boil for a quarter of an hour. Remove the vessel from the fire, and cover it; let it rest a little, and, as soon as the liquor has become limpid, decant it cautiously from the sediment. The antimoniated sulphur will, in part, be separated by the cooling of the liquor: add a sufficient quantity of diluted sulphuric acid to precipitate the whole of it, which happens with excess of acid; agitate the mixture, that what is last thrown down (which is of an orange colour) may be mixed with the rest. After allowing it to stand a sufficient time, pour the liquor from the sediment, which is to be washed with cold water, as long as it affects litmus paper. Lastly, dry it upon blotting paper.

IN both of these preparations, the result is a hydro-sulphuret of antimony with excess of sulphur. Formerly there were two officinal antimonials of this nature, one of which *(Kermes mineral)* contained no excess of sulphur, and the other *(Sulphur auratum antimonii)* contained a much larger proportion of sulphur than those now officinal, which, therefore, hold a middle place between them. According to Thenard, they consist of

| | Sulph. aur. | Kermes min. |
|---|---|---|
| Brown oxide of antimony | 68.3 | 72.760 |
| Sulphuretted hydrogen | 17.877 | 20.298 |
| Sulphur - | 12. | 4.156 |
| Water and loss - | 1.823 | 2.786 |
| | 100. | 100. |

Thenard considers the sulphur as only mechanically and accidentally mixed; and that the essential difference between these preparations consists in the degree of oxidizement of the antimony.

But, notwithstanding the great celebrity of Thenard as a chemist, and his having paid particular attention to the combinations of antimony, we may be allowed to doubt the accuracy of his opinion; for it must appear to every one, an affected refinement of analysis, to discover in such substances

a difference of only 2 *per cent.* of oxidizement, more especially as he admits an inaccuracy in his analysis of at least as much: and as Proust has since shewn that both preparations contain the protoxide, the only difference between these bodies appears to be the proportion of sulphur they contain.

Hydro-sulphuret of antimony is prepared either in the dry way, as directed by the Dublin, or in the humid way, as in the receipt of the Edinburgh and London colleges. When sulphuret of antimony is boiled in a solution of potass, water is decomposed, the hydrogen combines with the sulphur, and the antimony is oxidized; and, as long as the solution boils, it contains a mixture of hydro-sulphuret of potass and hydro-sulphuret of antimony. But, on cooling, a great part of the latter precipitates in the form of a red powder (Kermes mineral.)

In the dry way, when sulphuret of antimony and carbonate of potass are melted together, the carbonic acid is expelled with effervescence, and a sulphuret of potass and antimony is formed. On boiling this in water, water is decomposed, the antimony is oxidized, and the hydrogen combines with the sulphur. The sulphuretted hydrogen, thus formed, combines partly with the potass, and partly with the oxide of antimony.

Such is the present theory. With regard to the practice; for the preparation of Kermes mineral, Lemery melted sixteen parts of sulphuret of antimony, and one of sulphur, with eight parts of carbonate of potass. The last edition of the Prussian Pharmacopœia directs two parts of sulphuret of antimony, and one of exsiccated carbonate of soda, to be melted, and afterwards boiled fifteen minutes in six or eight parts of water, which, on cooling, deposites a considerable quantity of kermes. The fluid from which the kermes has been deposited may be again boiled in the residuum of the first decoction, and it will dissolve a fresh proportion of kermes; and this process may be repeated as long as there remains any to dissolve. After this the residuum, when melted, consists almost solely of antimony. It therefore seems, that the alkali renders almost all the sulphur soluble, and only disposes the oxidizement of as much antimony as is capable of combining with the sulphuretted hydrogen. There appears to be no reason why the whole of the antimony should not be converted into kermes, by employing a proper addition of sulphur and alkali.

Kermes is also made in the humid way. Fourcroy boils, in twenty parts of water, six parts of pure potass of commerce, and into the boiling solution throws about the twen-

tieth part of the weight of the alkali, or 0.3 of a part, of powdered sulphuret of antimony, and continues the boiling for seven or eight minutes, then filters, and allows the kermes to precipitate by cooling. Hermbstadt uses very different proportions; for he boils twelve parts of sulphuret of antimony, and three of salt of tartar, in ninety-six parts of water, down to sixty-four, and then filters, &c. Gren employs four parts of sulphuret of antimony, sixteen of carbonate of potass, and sixty-four of water, and boils for several hours. Göttling boils eight parts of sulphuret of antimony, and two of sulphur, in a sufficient quantity of solution of potass, down to one half.

The precipitated sulphuret of antimony, like the kermes, may be prepared either in the dry or in the moist way. The latter mode seems to be the most universally employed on the Continent. Göttling boils two parts of sulphuret of antimony, and three of sulphur, in a sufficient quantity of a recent solution of potass, filters the solution, and precipitates with sulphuric acid, diluted with twelve times its weight of water. The Prussian college use equal parts of sulphuret of antimony and of sulphur. Wiegleb treats in the same manner two parts of sulphuret of antimony with one of sulphur. But to his proportions it has been objected, that the product resembles kermes more than sulphur auratum. If this objection be just, it must apply, in a still stronger degree, to the formula of the British colleges, in which no sulphur is added.

In the dry way, two parts of sulphuret of antimony and three of sulphur may be melted with five or six of pure carbonate of potass in a covered crucible, as quickly as possible, poured into an iron mortar, reduced to powder, and dissolved by boiling the powder in water. The solution is to be filtered warm, diluted with a sufficient quantity of water, and precipitated by dilute sulphuric acid. By some, the solution is allowed to remain at rest for twenty-four hours before it be filtered, and some precipitate by nitrous acid.

The process for making the golden sulphuret of antimony depends on the property which the hydroguretted sulphuret of potass possesses, of dissolving, and retaining dissolved, even at ordinary temperatures, a portion of orange oxide of antimony; and as the attraction by which potass exists in this compound is weaker than its affinity for acids, on the addition of any acid, the potass unites with the acid, a portion of sulphuretted hydrogen gas escapes, and the oxide of antimony combined with the rest of the sulphur and hydrogen, is precipitated in the form of a light orange powder. When the acid is added gradually, the proportion of oxide of anti-

mony decreases, while that of the sulphur increases in each successive portion of precipitate. Hence, in the old manner of preparing this substance, from the scoriæ formed in reducing antimony from its sulphuret, and which contained but little sulphur, the two first portions of precipitate, being dark coloured, were rejected, and only the produce of the third precipitation retained for use. The want of economy in this process is sufficiently obvious, as well as the very great improvement in modern times, of adding a sufficient quantity of sulphur, and precipitating the whole at once.

*Medical use.*—In its action on the body, the hydro-sulphuret of antimony is an active substance, and, according to the dose, acts as a diaphoretic, cathartic, or emetic. Its use is, in this country, in a great degree superseded by more certain preparations.

### OXYDUM ANTIMONII NITRO-MURIATICUM. *Dub.*
### *Nitro-Muriatic Oxide of Antimony.*

Take of

Prepared sulphuret of antimony, two ounces;
Muriatic acid, eleven ounces by measure;
Nitrous acid, one drachm, by measure.

Add the sulphuret gradually to the acids, previously mixed in a glass vessel, avoiding the vapours. Digest with a heat gradually increased, until the effervescence cease, and then boil for one hour. Filter the liquor when cold, and receive it when filtered in a gallon of water. The oxide of antimony will fall to the bottom. Wash this repeatedly in a sufficiently large quantity of water, until the liquor poured off be perfectly free from acid, as known by the test of litmus; and, lastly, dry the oxide upon bibulous paper.

MURIATE of antimony was originally prepared by distilling sulphuret of antimony with muriate of quicksilver. Muriate of antimony, or butter of antimony, as it was called from its appearance when recently prepared, passes over into the receiver, and black sulphuret of quicksilver remains in the retort; or by increasing the heat, red sulphuret of mercury, which, when obtained by this process, was formerly termed Cinnabar of antimony, is sublimed. But this mode of preparation is both expensive and dangerous to the health of the operator.

Scheele invented a method of avoiding these inconveniences. A sulphuretted oxide of antimony is prepared by deflagrating two parts of sulphuret of antimony with three of nitrate of potass in an iron mortar. The mass thus obtained is pow-

dered, and one pound of it put into a glass vessel, on which is poured first a mixture of three pounds of water and fifteen ounces of sulphuric acid, and afterwards fifteen ounces of powdered common salt. The whole is digested for twelve hours, and stirred all the while, and the solution, when cool, strained through linen. On the residuum one-third of the above menstruum is poured, and the mixture digested and strained.—Mr Stott says, that the digestion need not be continued longer than two or three hours, and that the heat must be kept moderate, as the muriate of antimony begins to evaporate before it boils. Although this preparation, as we shall afterwards see, answers the purpose for which it is intended, it is a mixture of sulphate of soda and muriate of antimony.

The muriate may be obtained separately from the other salts by distillation. This was proposed by Gmelin, and improved by Wiegleb, who distilled a mixture of one part of sulphuret of antimony, four of muriate of soda, and three of sulphuric acid diluted with two of water; but the product is rendered impure by the admixture of sulphur, and there is great danger of the vessels bursting, from the immense quantity of sulphuretted hydrogen gas disengaged.

The Prussian Dispensatory pours upon two ounces of crocus of antimony, and six of dried muriate of soda, introduced into a retort, four ounces of sulphuric acid previously diluted with two ounces of distilled water, and distils. But we may observe, that the antimony in the crocus is seldom sufficiently oxidized or deprived of its sulphur, which occasions the production of much sulphuretted hydrogen gas; and from the concentrated state in which the materials are employed, the muriatic acid gas is sometimes disengaged, especially if the heat be improperly applied, so rapidly, that it has not time to act upon the oxide of antimony.

At last, in 1797, Göttling, by substituting the glass of antimony for the crocus, diluting further the sulphuric acid, and using the muriate of soda crystallized, removed these inconveniences. He introduces into a retort a mixture of four ounces of glass of antimony in powder, with sixteen of muriate of soda, and then pours into it twelve ounces of sulphuric acid, diluted with eight of water. He lutes on a tubulated receiver with gypsum, and distils to dryness in a sand bath, with a heat gradually increased. By this process, he says, about twenty ounces of very strong fuming solution of muriate of antimony are obtained. The residuum in the retort is sulphate of soda, but unfit for internal use, on account of its being mixed with some antimony.

Muriate of antimony or antimonane, as it is called by Sir

H. Davy, is crystallizable, but in general is a soft semitransparent substance, of a yellowish-white colour, very fusible and volatile at a moderate degree of heat. It is remarkably deliquescent, and forms a permanent solution; but if more than a certain proportion of water be added, it is decomposed; a large quantity of submuriate of antimony being precipitated, in the form of white silky crystals, while a supermuriate remains in solution. Antimonane consists, according to the experiments of Dr John Davy, of 56 antimony and 44 chlorine, or of *one* proportion of antimony and *two* of chlorine.

Muriate of antimony has been used as a caustic, but not for a long time; it is so extremely unmanageable. It is now only prepared as preliminary to the precipitation of the submuriate of oxide of antimony from it.

In the process of the Dublin college, the antimony oxidized by the nitric acid is dissolved in the muriatic; and the muriate of antimony thus formed is decomposed by water. According to Sir H. Davy, a portion of the water furnishes oxygen to the antimony, and hydrogen to the chlorine, which are thus converted into protoxide and muriatic acid; a supermuriate of antimony remains in solution, and an insoluble submuriate is precipitated in the form of white acicular or silky crystals, formerly known under the title of *Pulvis Algarotti*, and is the *oxydum antimonii nitro-muriaticum* of the Dublin college. That this is a submuriate, is proved by its yielding a small proportion of muriate on distillation, as pointed out by Bergman.

### ANTIMONII OXYDUM. *Lond.*
### *Oxide of Antimony.*

Take of
- Tartarized antimony, one ounce;
- Subcarbonate of ammonia, two drachms;
- Distilled water, what is necessary.

Dissolve the salts separately in water, then mix the liquors, and boil until the oxide of antimony be precipitated. Wash this with water, and dry it.

THIS process, which is now introduced by the London college as a substitute for the numerous impure oxides of antimony in preceding Pharmacopœias, will furnish a very pure protoxide of antimony, and does not seem liable to any objection. What its effects as a medicine are, I know not; but I am disposed to think that they will be more uniform than those of the more uncertain products, and that therefore the introduction of the formula is a real improvement upon the pharmaceutical treatment of antimony.

### Oxidum antimonii cum phosphate calcis. *Ed.*
*Oxide of Antimony, with Phosphate of Lime.*

Take of
Sulphuret of antimony, in coarse powder;
Shavings of hartshorn, equal weights.

Mix and put them in a shallow iron pot, red-hot, and stir the mixture constantly, until it become of an ash-grey colour, which is then to be removed from the fire, ground into powder, and put into a coated crucible. Lute to this crucible another inverted over it, and perforated in the bottom with a small hole, and apply the fire, which is to be raised gradually to a white heat, and kept in that increased state for two hours. Lastly, grind the matter, when cold, into a very fine powder.

### Pulvis antimonialis. *Dub.*
*Antimonial Powder.*

Take of
Sulphuret of antimony, in coarse powder;
Shavings of hartshorn, of each two pounds.

Boil the hartshorn in a sufficient quantity of water, to separate the animal jelly. Then dry it, and mix it with the antimony. Throw the mixture into a wide iron pot, heated to redness, stirring continually until the sulphureous vapour cease, and the mass acquire an ash-grey colour. When cold, reduce it to powder, and put it into a luted crucible. Invert another crucible, having a small hole in its bottom, over this, and lute them accurately together. Roast the powder for two hours, with a heat gradually increased to whiteness, and, when cold, grind it to a very fine powder.

### *Lond.*

Take of
Sulphuret of antimony in powder, one pound;
Horn-shavings, two pounds.

Mix, and throw them into a wide iron pot, heated to whiteness, stirring them assiduously until they become of an ash-grey colour. Take them out and powder them. Put the powder into a coated crucible, to which another crucible, having a small hole in its bottom, and inverted over it, is luted. Then apply heat, and gradually increase it, until it be kept white for two hours. Triturate the residuum into very fine powder.

This is supposed to be nearly the same with the celebrated nostrum of Dr James, the composition of which was ascer-

tained by Dr George Pearson, to whom we are also indebted for the above formula.

By burning sulphuret of antimony and shavings of hartshorn in a white heat, the sulphur is entirely expelled, and the antimony is oxidized, while the gelatine of the hartshorn is destroyed, and nothing is left but phosphate of lime, combined with a little lime. Therefore, the mass which results is a mixture of oxide of antimony and phosphate of lime, which corresponds, at least as to the nature of the ingredients, with James's powder, which, by Dr Pearson's analysis, was found to consist of 43 phosphate of lime, and 57 oxide of antimony. M. Pulley also analysed some James's powder, and found it composed of protoxide of antimony 37, phosphate of lime 21, sulphate of potass 24, and potass combined with protoxide of antimony 18. On which occasion, M. Cadet, ignorant that even quack medicines were often imitated and adulterated, accuses Dr Pearson of having sanctioned with his name a false analysis, in order to conceal a secret so profitable to his country! Mr Chenevix, by considering the uncertainty of the application, and the precarious nature of the agency of fire, by which means a variable portion of the oxide of antimony may be volatilized, and that which remains may be oxidized in various degrees, proposes to prepare a substitute for James's powder by dissolving together equal weights of submuriate of antimony, and of phosphate of lime, in the smallest possible quantity of muriatic acid, and then pouring this solution gradually into water sufficiently alkalized with ammonia. As muriate of antimony is partially decomposed by water, it is absolutely necessary that the muriatic solution be poured into the alkaline liquor; for, by an opposite mode of procedure, a great part of the antimony would be precipitated in the state of submuriate, and the first portion of the precipitate would consist chiefly of antimony and the last of phosphate of lime.

Phosphate of lime is most conveniently obtained pure by dissolving calcined bone in muriatic acid, and precipitating it by ammonia. If the ammonia be quite free from carbonic acid, no muriate of lime is decomposed. Mr Chenevix also found, that his precipitate is entirley soluble in every acid which can dissolve either phosphate of lime or oxide of antimony separately, and that about 0.28 of James's powder, and, at an average, 0.44 of the pulvis antimonialis of the late London Pharmacopœia, resist the action of every acid.

In the new edition, twice the proportion of hartshorn shavings is used, which is said to obviate the inconvenience

of the vitrification of part of the antimony when too high a temperature was applied, to render the process more manageable, and to furnish a whiter product, but it does not correspond with Dr Pearson's analysis of James's powder, for which it was intended as a substitute, and alters materially the strength of an established preparation.

*Medical use.*—The oxide of antimony with phosphate of lime, howsoever prepared, is one of the best antimonials we possess. It is given as a diaphoretic in febrile diseases, in doses of from three to eight grains, repeated every third or fourth hour. In larger quantities, it operates as a purgative or emetic. From its being insoluble in water, it must be given either in the form of a powder, or made into a pill or bolus.

TARTRAS ANTIMONII, *olim* TARTARUS EMETICUS. *Ed.*
*Tartrate of Antimony*, formerly *Tartar-Emetic.*

Take of
Sulphuret of antimony,
Nitrate of potass, equal weights;
Supertartrate of potass, what may be required.

Powder the sulphuret and nitrate separately, mix them thoroughly, and inject them into a hot crucible. After the deflagration is finished, separate the reddish matter obtained, from the white crust, and grind it to a very fine powder, which is afterwards to be washed with much warm water, and then dried.

Mix this powder by trituration, with an equal weight of supertartrate of potass, and boil the mixture with four times its weight of water for an hour, and evaporate the filtered solution so as to crystallize.

THE first part of this process is that formerly directed for the preparation of what was formerly called Crocus of Antimony, which is no longer ordered as a separate process, and therefore must be spoken of in this place.

In this process, the nitric acid of the nitre, and part of the sulphuret, are mutually decomposed: the sulphur is acidified, and combines with the potass of the nitre, while the antimony is converted into protoxide, which combines with the undecomposed portion of the sulphuret, and forms a dark brown, opaque, vitrified mass; so that, after the scoriæ, and other saline matters, have been removed by washing, the substance which remains, according to Proust, consists of three parts of protoxide of antimony, and one of sulphuret of antimony.

With regard to the mode of preparation, Bergman observes, that by the common process of throwing the mixture

into an ignited uncovered crucible, there is sometimes a loss of nearly one half; and therefore advises the mixture to be put into a cold crucible, which is to be covered, and heated till the matter melts, by which means there is very little loss. With Dörfurt, however, this process did not succeed; because, as soon as the applied heat reached a certain degree, the whole mass took fire, and deflagrated violently. Indeed, in this process, the application of heat to the crucible is perfectly unnecessary, and the Berlin Pharmacopœia directs the mixture to be put into a clean iron pot, and kindled by touching it with a bit of live coal, or, what is better, the end of a tobacco pipe, or iron rod, heated to redness. In this the fusion and separation of the scoriæ is no less complete than when the mixture is gradually projected into a heated crucible, and, unless for very great quantities, it is most convenient.

The crocus is kept in the shops, is almost universally prepared with less nitre than is here ordered. The consequence is, that too much sulphur remains not acidified, the antimony is scarcely oxidized, and the preparation is unfit for the uses to which it ought to be applied. When nitre has been thus culpably economized, the crocus has a steel grey, instead of a liver brown colour.

The sulphuretted oxide of antimony is a very uncertain preparation, often operating with very great violence. Its internal use is, therefore, almost proscribed, or at least confined to veterinary practice. It is used in pharmacy, as the basis of other preparations in some Pharmacopœias; but the London college have rejected it altogether.

### ANTIMONIUM TARTARIZATUM. *Lond.*
### *Tartarized Antimony.*

Take of
- Sulphuret of antimony in powder, two ounces;
- Nitrate of potass, one ounce;
- Supertartrate of potass, two ounces;
- Sulphuric acid, two ounces by weight;
- Distilled water, a pint and a half.

Mix the acid with the water (half a pint, Dr Powell) in a proper glass vessel, and heat them in a sand-bath. When they have become moderately heated, gradually add the sulphuret and nitrate mixed; then filter, and boil to dryness. Wash the residuum with distilled water until it be free from taste, and while still wet mix it with the supertartrate of potass, and throw it into a pint of distilled water; then boil down the solution, and set it aside to crystallize.

TARTARUM ANTIMONIATUM *sive* EMETICUM. *Dub.*
*Antimoniated* or *Emetic Tartar.*

Take of
Nitromuriatic oxide of antimony, two ounces;
Crystals of tartar, in very fine powder, two ounces and a half.
Distilled water, eighteen ounces by measure.

Boil the water in a glass vessel, then gradually throw into it the oxide and tartar, previously mixed, and boil for half an hour; then filter the liquor through paper, and crystallize by slow cooling.

THE tartaric acid is capable of combining, in many examples, with two bases at the same time, forming with them triple crystallizable salts. In the present instance, it is combined with oxide of antimony and potass; and as the potass is essential to its constitution, and the real tartrate of antimony is a different salt, its name, on chemical principles, should certainly have been Tartrate of Antimony and Potass.

In the preparation of this salt, the different combinations of protoxide of antimony have been employed. Any of them will afford a very pure salt. The crocus, precipitated oxide, submuriate and glass, are all occasionally employed. The Edinburgh college uses the crocus. To this the principal objection is, that it is never found in the shops in a state fit for this purpose. Even when properly prepared, it is with difficulty acted upon by the supertartrate of potass, unless it be levigated and elutriated. Mr Phillips found, that 100 parts of cream of tartar dissolved only 6 parts out of 100 of very finely powdered crocus, 16 when levigated, but 75 when it was elutriated; and in the last case, the liquor assumed a deep green colour, which, though proceeding from the presence of iron, is a test that a sufficient proportion of the metallic oxide is dissolved, as it does not occur until the tartar has taken up three-fourths of its weight of the crocus. But, besides the expence of levigating and elutriating the crocus, it is liable to be mixed with carbonate of lime, derived probably from the stones employed in the levigation; and the crystals of tartarized antimony procured in this way are consequently contaminated even with a larger proportion of tartrate of lime than is furnished by the tartar. The glass is more easily soluble than the crocus, as, when finely powdered, 78 parts were dissolved, and gave the solution a dark green colour. But this oxide is very expensive, and glass of lead is sometimes fraudulently substituted for it. When the glass or crocus is used, Mr Phillips recommends, that after being powdered or levigated, they should be boiled in dilute sulphuric acid to re-

move any carbonate of lime, and that a small quantity of sulphuric acid should be added to decompose the tartrate of lime. To the oxide of antimony, as prescribed by the London college 1809, Mr Phillips objected its great expence, its quantity being too small in proportion to the tartar, and that the crystals of tartar-emetic formed with it, as well as with the crocus or glass, are contaminated with the tartrate of lime usually contained in the tartar. To the use of the submuriate, as directed by the Dublin college, this last objection does not apply, because the muriatic acid retains the tartrate of lime in solution when the tartrate of antimony crystallizes. Having criticized the processes of all the colleges, Mr Phillips proposed to substitute one of his own. The qualities requisite in an eligible method of preparing tartar-emetic, he says, are, the certainty of obtaining protoxide of antimony unmixed with peroxide or sulphuretted oxide, yet not absolutely pure, but mixed with a substance capable of preventing the crystallization of the tartrate of lime; moderate expence, and the possibility of using iron vessels, both in preparing the oxide of antimony and the tartarized antimony. These requisites, Mr Phillips thinks, he has found in employing the sulphate of antimony prepared by boiling powdered metallic antimony in twice its weight of sulphuric acid to dryness in an iron vessel over a common fire, and stirring it with an iron spatula. The greyish coloured product was thrown into water, and washed, till the uncombined sulphuric acid was removed. 100 parts of the subsulphate thus procured were boiled in a solution of an equal weight of tartar; about 76 parts of the subsulphate were readily dissolved, and the solution, when filtered, afforded at the first crystallization rather more than 90 parts of crystals of tartarized antimony, perfectly white and unmixed with any extraneous salt. The solution, by further evaporation, furnished an additional quantity of crystals of emetic tartar, slightly incrusted with sulphate of lime, from which, however, they were completely purified by solution, and repeating the crystallization. A considerable quantity of sulphate of lime was also deposited and separated during the evaporation. This process Mr Phillips asserts to be neither tedious, difficult, uncertain nor unsafe. The process adopted in the present edition of the London Pharmacopœia is of the same nature, depending upon the formation of a sulphate of antimony, although in a more complicated way. I have not repeated it, but Dr Powell tells us that the new formula, which "has, after numerous trials, been adopted, is due to Mr Hume of Long-Acre, to whose practical skill it is right to acknowledge great obligation. It is ne-

cessary that the whole of the supertartrate of potass should be combined with the oxide, and therefore that there should be a full sufficiency of the latter, otherwise the first crystals, as it cools, will be of the supertartrate only; whilst, on the other hand, if a superabundance of oxide of antimony be used, it will remain upon the filter, and not influence the crystals: the former inconvenience, therefore, is especially to be avoided, and for that purpose, more oxide than may be strictly necessary is directed. The evaporation must not be carried too far, as there appears to be some tartrate of potass in the solution, whose crystals will, in that case, be mixed with the triple salt. The crystals ought always to be formed, for it is only when they are that the proportions of the salt can be considered as precise." But whatever form of protoxide of antimony may be preferred, the quantity of water employed must be sufficient to dissolve the tartar-emetic formed. The time during which the ebullition is to be continued, is stated differently by different pharmaceutists. No harm can arise from continuing it longer than is absolutely necessary; but it is certainly a waste of time and fuel to protract it for hours.

Another circumstance which renders tartar-emetic variable in its effects, is, the mode of crystallization. Some evaporate it to dryness; others to a pellicle, and set it aside to crystallize; and others again crystallize by slow evaporation. On account of the silica which is combined with the oxide of antimony, and which, being held in solution by the potass, impedes the crystallization, and varies the nature of the product, Vauquelin recommends that the solution be first evaporated to dryness, and that the saline mass obtained should be redissolved in boiling water, and then crystallized; for, towards the end of the first evaporation, the silica separates, and becomes totally insoluble. In this way, he says, that we obtain both a purer salt, and in larger quantity. If we employ an excess of supertartrate of potass, part of it will remain undecomposed, and will crystallize before, or along with the tartar-emetic. This source of impurity is easily avoided, by using an excess of the antimonial oxide, which remaining undissolved, occasions no error, and prevents the necessity of throwing away the crystals which form on the filtering paper, if the solution be saturated.

The primitive form of the crystals of tart[illegible] antimony and potass seems to be the regul[illegible]hedron, but it assumes a variety of second[illegible] It has a styptic metallic taste. It is solubl[illegible]ree times its weight of water at 212°, and in fif[illegible] at 60°. As this statement of its solubility is very different from that of most writers, from Bergman to Fourcroy,

who say that it requires 80 parts of water at 60°, and somewhat less than 40 of boiling water, it is necessary to mention, that it was ascertained by careful experiment, with very fine crystals of tartar-emetic, more than half an inch in length, and perfectly free from the admixture of any foreign salt. The crystals, by exposure to the air. become white and opaque, but do not readily fall to powder. The property of deliquescing, ascribed to them by Göttling, must have arisen from the presence of other salts, as he does not prepare his tartar-emetic by crystallization, but by evaporating the solution to dryness. The solution of tartar-emetic slightly reddens tincture of turnsole. It is decomposed by acids, alkalies, alkaline carbonates, sulphuretted hydrogen and its compounds, vegetable juices, decoctions, and infusions, and many of the metals.

According to Thenard, tartar-emetic consists of tartrate of antimony 54, tartrate of potass 34, water 8, and loss 4; or oxide of antimony 38, tartaric acid 34, potass 16, water and loss 12; and by estimation from the analysis of tartrate of potass, and supertartrate of potass, by the same chemist, it appears, that to saturate 38 parts of protoxide of antimony, 70.4 of supertartrate of potass are necessary: the whole of the superfluous acid, being 16, combines with the oxide, while 34 of the tartrate of potass combine with the tartrate of antimony thus formed, and 20.4 of tartrate of potass remain in solution in the mother water. But Mr Phillips found, that 100 parts of supertartrate of potass dissolve 70 of protoxide of antimony, which makes me distrust Thenard's estimates.

From what has been said, it will appear, that without any fraudulent intention, tartar-emetic is often imperfect. Its goodness should be ascertained by taking a few crystals promiscuously from every fresh parcel, washing them in water, and then introducing each crystal separately into dilute solutions of sulphuret of potass, when, if the salt be perfect, a considerable orange precipitate will occur in each. But tartar-emetic is more commonly sold in the form of powder, to conceal its imperfections; this ought to be examined in the same way as the crystals; but as it may consist of a mixture of tartarized antimony and tartar, it ought to be rejected, if, in attempting to prepare with it the *liquor antimonii tartarizati*, it do not rea-
clear solution, dissolve in the water, and form a perfectly
I have been thus particular and after the addition of the wine.
tion and chemical properties of tartar emetic, account of the prepara-
only of all the preparations of antimony the most cause it is not in

its operation, but is almost indispensable for the successful practice of medicine.

*Medical use.*—In doses of from one to three grains it operates as an emetic, and sometimes as a cathartic. In smaller doses, it excites nausea, and proves a powerful diaphoretic and expectorant. As an emetic, it is chiefly given in the beginning of fevers and febrile diseases, in chincough, and, in general, whenever we wish to evacuate the stomach quickly. When great debility is present, and in the advanced stages of typhoid fever, its use is improper, and even sometimes fatal. As a diaphoretic, it is given in small doses, of from an eighth to a quarter of a grain; and as an expectorant, in doses still smaller.

The only proper form for exhibiting it is in solution; and as the intensity of its action on the body is liable to variation, from differences in its own strength, and in the constitution of the patient, it should almost always be given in divided doses, at short intervals, if we wish to excite vomiting; and at longer intervals, if we wish it to act only on the skin or lungs.

### VINUM TARTRATIS ANTIMONII. *Ed.*
### *Wine of Tartrate of Antimony.*

Take of

Tartrate of antimony, twenty-four grains;
Sherry wine, one pound.

Mix them, so that the tartrate of antimony may be dissolved.

### LIQUOR ANTIMONII TARTARIZATI. *Lond.*
### *Solution of Tartarized Antimony.*

Take of

Tartarized antimony, one scruple;
Boiling distilled water, four fluidounces;
Wine, six fluidounces.

Dissolve the tartarized antimony in the boiling distilled water, then add the wine.

FORMERLY antimonial wine was a fortuitous preparation, by steeping glass of antimony in white wine; a portion of the glass of antimony was dissolved by the supertartrate of potass contained in the wine; and as the quantity of this is variable, so also the quantity of oxide of antimony dissolved varied: and, therefore, the preparation is with propriety entirely rejected, since its strength could never be known. It was also formerly to be regretted, that the strength of the solutions of tartar-emetic in wine, as prescribed by the different colleges, was not uniform. According to the Edinburgh

college, one ounce contained two grains of tartar-emetic, while, according to the London, it contained four grains. Both now contain two grains.

In its employment and effects, the vinous solution of tartar-emetic does not differ from one made with water.

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## Chap. VI.—SILVER.

### Nitras argenti. *Ed.*
*Nitrate of Silver.*

Take of
Purest silver, flatted into plates, and cut in pieces, one part;
Diluted nitrous acid, two parts;
Distilled water, one part.

Dissolve the silver in the acid and water previously mixed, in a matrass with a gentle heat, and evaporate the solution to dryness. Then put the mass into a large crucible, and place it on the fire, which should at first be gentle, and afterwards increased by degrees till the mass flows like oil; then pour it into iron pipes, previously heated and anointed with tallow. Lastly, keep it in a glass vessel very well corked.

*Dub.*

Take of
Silver, flatted into plates, and cut in pieces,
Nitrous acid, of each one ounce by weight;
Distilled water, two ounces, by measure.

Put the silver in a glass phial, placed in a sand-bath, and pour on the acid, previously diluted with the water; then, gradually increasing the heat, dissolve the metal, and evaporate the liquor to dryness. Liquefy the mass which remains, in a crucible over a slow fire. Pour it into proper moulds, and keep it in a glass vessel well corked.

*Lond.*

Take of
Silver, one ounce;
Nitric acid, one fluidounce;
Distilled water, two fluidounces.

Mix the nitric acid with the water, and dissolve the silver in the mixture in a sand-bath. Then gradually increase the

heat, to dry the nitrate of silver. Melt this in a crucible with a gentle fire, until the water being expelled it cease to boil; then immediately pour it out into proper moulds.

THE acid employed must be very pure. If it contain, as the acid of commerce always does, sulphuric or muriatic acid, these react upon the nitrate as soon as it is formed, and a white precipitate, consisting of sulphate and muriate of silver, falls to the bottom.

The method which the refiners employ for examining the purity of their aquafortis (the name they give to dilute nitrous acid,) and purifying it, if necessary, is to let fall into it a few drops of a solution of nitrate of silver already made; if the liquor remain clear, it is fit for use: otherwise, they add a small quantity more of the solution, which immediately turns the whole of a milky white colour; the mixture being then suffered to rest for some time, deposites a white sediment, from which it is cautiously decanted, examined again, and, if necessary, farther purified by a fresh addition of this solution.

Mr Phillips objected to the London process 1809, that there was an unnecessary waste of nitric acid, as one fluidounce and a half was sufficient to dissolve about 1023 grains, instead of 480. It has accordingly been reduced to an ounce.

It is necessary to employ very pure water in this process, for the muriates and earthy salts which common water generally contains, precipitate part of the silver in the state of a muriate or oxide. If distilled water be not used, the water should be added to the acid before it be tried, and purified by the nitrate of silver.

The solution will go on the more speedily, if the silver, flatted into thin plates, be rolled loosely up, so that the several surfaces do not touch each other. By this management, a greater extent of the surface is exposed to the action of the menstruum, than when the plates are cut in pieces and laid above each other. If the silver be alloyed with copper, the solution will have a permanent greenish-blue colour, and acquire a bright blue on the addition of ammonia. If it contain gold, the gold is not dissolved, but is found at the bottom of the solution, in the form of a black or deep purple powder.

The crucible ought to be of porcelain; as, with the common crucibles, the loss arising from the nitrate of silver sinking into their substance is too great. It ought also to be large enough to hold five or six times the quantity of the dry matter; for it bubbles and swells up greatly, so as to be apt to run over. During the evaporation also, little drops are now and then spirted up, whose causticity is increased by

their heat, against which the operator ought therefore to be on his guard. The fire must be kept moderate till this ebullition ceases, and till the matter becomes consistent in the heat that made it boil before: the fire is then to be quickly increased, till the matter flows thin at the bottom like oil, on which it is to be immediately poured into the mould; for if the heat be continued after this, the nitrate of silver begins to be decomposed, and the silver is reduced.

The mould should be of iron, or one may be formed in a mass of tempered tobacco pipe clay, not too moist, by making, with a smooth stick, previously greased, a sufficient number of holes. Each piece is to be wiped clean from the grease, and wrapt up in soft dry paper, not only to keep the air from acting upon them, but likewise to prevent their corroding or discolouring the fingers in handling.

Nitrate of silver is crystallizable. Its crystals are brilliant plates, having a variable number of sides. Their taste is austere, and intensely bitter. They are very soluble in water, but permanent in the air and not deliquescent. They are decomposed by heat, light, phosphorus, charcoal, many metals, all the alkalies and earths, sulphuric, muriatic, phosphoric, and fluoric acids, and by the salts they form. When deprived of water, and melted according to the directions of the colleges, nitrate of silver forms a black or dark grey coloured mass, hard, sonorous, and consisting of radii, diverging from the centre. It is not deliquescent when free from copper, which is seldom the case. It may, however, be prepared perfectly pure, even from a solution containing copper, by evaporating and crystallizing it as long as it furnishes firm tabular crystals. These are then to be washed with a little distilled water, and melted with a gentle heat. The nitrate of copper remains in the mother water, from which the silver it contains may be precipitated by muriatic acid.

*Medical use.*—A strong solution of nitrate of silver corrodes and decomposes animal substances: in a more diluted state, it stains them of an indelible black; and, for this purpose, it is now used as an indelible marking ink. The fused nitrate of silver is the strongest and most manageable caustic we possess, and is employed to remove fungous excrescences, callous edges, warts, strictures in the urethra, and the like. It is also used to destroy the venereal poison in chancres, before it has acted on the system. A weak solution of it may be applied, as a stimulus, to indolent ulcers, or injected into fistulous sores, and is almost specific in ringworm.

Notwithstanding its causticity, it has been given internally. Boërhaave, Boyle, and others, commend it highly in hydro-

pic cases. The former assures us, that, made into pills with crumb of bread and a little sugar, and taken on an empty stomach (some warm water, sweetened with honey, being drank immediately after,) it purges gently, without griping, and brings away a large quantity of water, almost without the patient's perceiving it: that it kills worms, and cures inveterate ulcerous disorders. He, nevertheless, cautions against using it too frequently, or in too large a dose; and observes, that it always proves corrosive and weakening to the stomach.

It has been more recently employed, and with success, in epilepsy and angina pectoris. On account of its very great activity, each pill should not contain above one-eighth or one-fourth of a grain.

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## Chap. VII.—ARSENIC.

### Arsenici oxydum sublimatum. *Lond.*
*Sublimed Oxyde of Arsenic.*

Reduce oxyde of arsenic to powder; then put it into a crucible; expose it to the fire, and sublime it into another cruble inverted over the first.

The white oxide of arsenic of commerce is obtained as an insignificant product in roasting cobalt ores, and is therefore often impure. By sublimation, however, it is easily separated from foreign matters, but the operator must be very careful to avoid the fumes which arise during the process.

### Liquor arsenicalis. *Lond.*
*Arsenical Solution.*

Take of
  Sublimed oxyde of arsenic, in very fine powder,
  Subcarbonate of potass from tartar, of each sixty-four grains,
  Distilled water, a pint.

Boil together in a glass vessel, until the arsenic be entirely dissolved. Add to the solution, when cold,
    Compound spirit of lavender, four fluidrachms.

Lastly, add as much distilled water as will make the whole amount exactly to a pint.

SOLUTIO ARSENICALIS. *Ed.*
*Solution of Arsenic.*

Take of
Oxide of arsenic in very fine powder,
Pure subcarbonate of potass, of each sixty-four grains;
Distilled water, fourteen ounces.

Boil together in a glass vessel, with a gentle fire, until the whole oxide be dissolved. To the liquor, when cold, add,
Compound spirit of lavender, half an ounce.
Distilled water, as much as will make the whole solution amount to sixteen ounces.

THIS preparation is a solution of arsenite of potass, and corresponds with Dr Fowler's tasteless ague-drop. The spirit of lavender is added merely to prevent its being mistaken for water, an accident which might happen from its want of colour and taste. It may also preserve it from decomposition, as stated by Mr Hume. Now that arsenic is so much used, it is useful to have an officinal solution of an uniform strength. Dr Powell has justly observed, that "where the dose is small, and the effects so powerful, the most minute attention to its proportion and preparation become necessary;" a drachm of the solution contains one-half of a grain, and it will seldom be necessary to give above ten minims for a dose.

ARSENIAS KALI. *Dub.*
*Arseniate of Kali.*

Take of
White oxyde of arsenic,
Nitrate of kali, of each one ounce.

Reduce them separately to powder; and, after mixing them, introduce them into a glass retort, placed in a sand-bath, which is to be gradually heated, until the bottom of the retort become obscurely red. It is expedient to transmit the vapours issuing from the retort, by means of a proper apparatus, through distilled water, that the nitrous acid extricated by the heat may be condensed. Dissolve the residuum in four pounds of boiling distilled water; and, after due evaporation, set it aside to crystallize.

THE Dublin preparation is crystallized arseniate of potass. On the application of the heat, the nitric acid of the nitre is decomposed, the oxygen combines with the oxide of arsenic, and converts it into arsenic acid, which unites with the potass, and nitrous gas and red nitrous acid escape. I should not think the latter of sufficient importance to be condensed, as

directed by the Dublin college; especially when we consider the possibility of its being contaminated by arsenic, unless, perhaps, according to the latter supposition, it be intended to preserve the operator from the noxious fumes.

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## Chap. VIII.—COPPER.

### Ærugo præparata. *Dub.*
### *Prepared Verdegris.*

Let the verdegris be ground to powder, and the minute particles be separated in the manner directed for the preparation of chalk.

The intention of this process is merely to obtain the subacetate of copper in the state of the most minute mechanical division.

### Solutio sulphatis cupri composita. *Ed.*
### *Compound Solution of Sulphate of Copper.*

Take of
- Sulphate of copper,
- Alum, of each three ounces;
- Water, two pounds;
- Sulphuric acid, an ounce and a half.

Boil the sulphates in the water, to dissolve them, and then add the acid to the liquor filtered through paper.

In this preparation, the substances dissolved in the water exert no chemical action on each other, and the composition was probably contrived, from the false idea, that the sum of the powers of substances having similar virtues, was increased by mixing them with each other.

*Medical use.*—It is chiefly used as a styptic for stopping bleedings at the nose; and, for this purpose, cloths, or dossils, steeped in the liquor, are to be applied to the part.

### Ammoniaretum cupri. *Ed.*
### *Ammoniaret of Copper.*

Take of
- Pure sulphate of copper, two parts;
- Subcarbonate of ammonia, three parts.

Rub them carefully together in a glass mortar, until, after the effervescence has entirely ceased, they unite into a vio-

let-coloured mass, which must be wrapped up in blotting paper, and first dried on a chalk stone, and afterwards by a gentle heat. The product must be kept in a glass phial, well corked.

CUPRUM AMMONIATUM. *Dub.*
*Ammoniated Copper.*

Take of
Sulphate of copper, one ounce;
Carbonate of ammonia, an ounce and a half.

Triturate them in an earthen-ware mortar, until, after the effervescence has entirely ceased, they unite into a mass, which is to be wrapped up in bibulous paper, dried, and kept in a phial, closed with a glass-stopper.

*Lond.*

Take of
Sulphate of copper, half an ounce;
Subcarbonate of ammonia, six drachms.

Rub them together in a glass mortar, until the effervescence cease; then dry the ammoniated copper, wrapped up in blotting paper, with a gentle heat.

IT may seem strange, that particular directions should be given concerning the manner of drying a mixture, which is prepared by rubbing two dry substances together. But such a phenomenon is by no means uncommon, and arises from the quantity of water of crystallization contained in the ingredients being greater than what is required in the new compound formed: As soon, therefore, as the ingredients begin to act upon each other, a quantity of water is set at liberty, which renders the mass moist.

The nature of this compound, and consequently the name which should be given it, are not yet sufficiently ascertained. Prepared according to the directions of the colleges, it evidently contains oxide of copper, ammonia, and sulphuric acid. If these substances be chemically combined, it should be denominated the Sulphate or Subsulphate of copper and ammonia. By exposure to the air during its exsiccation, and by keeping, it is apt to lose its blue colour entirely, and become green, and is probably converted into carbonate of copper. It should therefore be prepared in small quantities at a time.

*Medical use.*—Ammoniaret of copper has been strongly recommended in epilepsy; but, from its good effects sometimes ceasing after it has been used for some time, a want of success, in some cases, and the disagreeable consequences with

which its use is sometimes attended, it has not lately been much prescribed. In my practice, however, its success has been almost uniform and often astonishing. It is employed by beginning with doses of half a grain twice a-day, and increasing them gradually to as much as the stomach will bear. Dr Cullen sometimes increased the dose to five grains.

### AQUA CUPRI AMMONIATI. *Dub.*
### *Water of Ammoniated Copper.*

Take of
  Lime-water, eight ounces, by measure;
  Muriate of ammonia two scruples;
  Verdegris prepared, four grains.
Mix and digest them for twenty-four hours, then pour off the pure liquor.

### LIQUOR CUPRI AMMONIATI. *Lond.*
### *Solution of Ammoniated Copper.*

Take of
  Ammoniated copper, one drachm;
  Distilled water, one pint.
Dissolve the ammoniated copper in the water, and filter through paper.

In the Dublin preparation, the lime-water decomposes the muriate of ammonia, and forms muriate of lime; while the ammonia disengaged immediately reacts upon the oxide of copper contained in the verdigris, and renders it soluble. The mode of preparing this solution, now adopted by the London college, has the great merit of simplicity; but, unfortunately, from the large quantity of water employed, one half of the ammoniaret of copper is decomposed, and the oxide is precipitated. Mr Phillips found, that one fourth of the water used, or even less, was sufficient for the solution of the ammoniaret.

*Medical use.*—The solution is applied externally for cleaning foul ulcers, and disposing them to heal. It has been recommended also for taking off specks and films from the eyes; but, when used with this intention, it ought to be diluted with some pure water, as in the degree of strength in which it is here ordered, it irritates and inflames the eyes considerably. It is the readiest, and perhaps the most delicate, test of arsenic, by which its blue colour is converted into green.

## Chap. IX.—IRON.

### Limatura ferri purificata. *Ed.*
*Purified Filings of Iron.*

Place a sieve over the filings, and apply a magnet, so that the filings may be attracted upwards through the sieve.

This process does not fulfil the purpose for which it is intended; for the adhesion of a very small particle of iron renders brass and other metals attractable by the magnet. The filings of iron got from the shops of different artificers, which are always mixed with solder, and other metals, cannot be purified in this way, so as to render them fit for internal use; and, indeed, the only way they can be obtained sufficiently pure, is by filing a piece of pure iron with a clean file.

### Oxidum ferri nigrum purificatum. *Ed.*
*Purified Black Oxide of Iron.*

Let the scales of the oxide of iron, which are to be found at the foot of the blacksmith's anvil, be purified by the application of a magnet, which will attract only the smaller and purer scales.

### Oxydum ferri nigrum. *Dub.*
*Black Oxyde of Iron.*

Separate the scales of oxyde of iron, gathered at a blacksmith's forge, from impurities, by applying the magnet. Then reduce them to powder, of which the finest particles are to be collected in the manner directed for the preparation of chalk.

Here the application of the magnet is useful, because these scales contain no foreign metal, but are mixed with earthy and other impurities, which could be separated in no other way. The Prussian Dispensatory direct this oxide to be prepared by moistening the carbonate of iron with olive oil, distilling it to dryness in a retort, and heating it almost to redness. The iron, in this process, is reduced from the state of peroxide to that of protoxide.

### Subcarbonas ferri præparatus. *Ed.*
*Prepared Subcarbonate of Iron.*

Moisten purified filings of iron frequently with water, that

they may be converted into rust, which is to be ground into an impalpable powder.

*Dub.*

Take of

Iron-wire, any quantity.

Cut it into pieces, which are to be moistened frequently with water, and exposed to the air until they be corroded into rust. Then triturate them in an iron mortar, and by pouring water upon them, wash over the finest part of the powder, which is to be dried.

Iron is one of the most easily oxidized of the metals. By exposure at the same time to air and moisture, it is very quickly oxidized, while it also absorbs carbonic acid, and is converted into a reddish-brown pulverulent substance, well known by the name of rust of iron. For medical use it is prepared by trituration and elutriation.

### Carbonas ferri præcipitatus. *Ed.*
### Carbonas ferri. *Dub.*
### *Precipitated Carbonate of Iron.*

Take of

Sulphate of iron, four ounces;

Subcarbonate of soda, five ounces;

Water, ten pints.

Dissolve the sulphate in the water, and add the carbonate of soda previously dissolved in a sufficient quantity of water, and mix them thoroughly.

Wash the precipitated carbonate of iron with warm water, and afterwards dry it.

### Ferri subcarbonas. *Lond.*
### *Subcarbonate of Iron.*

Take of

Sulphate of iron, eight ounces;

Subcarbonate of soda, six ounces;

Boiling water, a gallon.

Dissolve the sulphate of iron and subcarbonate of soda separately, each in four pints of the water; then mix the solutions, and set aside until the precipitate subside; then having poured off the supernatant liquor, wash the subcarbonate of iron with warm water, and dry it wrapped up in bibulous paper, with a gentle heat.

On mixing the solutions of these salts together, there is an immediate mutual decomposition. Sulphate of soda is form-

ed, which remains in solution, and carbonate of iron, which is precipitated of a green colour. The precipitate, when first formed, is the carbonate of black oxide of iron, or contains the iron in the state of protoxide, the state in which it exists in the green sulphate of iron; but in the process of drying, it absorbs more oxygen, becomes of a red colour, and part of it is converted into red oxide of iron. As the precipitate is extremely light and bulky, it is not easily separated by allowing it to subside, and pouring off the clear liquor; filtration should therefore be employed. The carbonate of soda is used in preference to the carbonate of potass, on account of the greater solubility of sulphate of soda than of sulphate of potass, which renders the subsequent ablution of the salt more easy.

Mr Phillips found very great differences in the results, from very slight differences in conducting the process, as appears from the following table, to which is added the results when subcarbonate of potass was employed instead of subcarbonate of soda.

| Precipitated in | Washed in | Dried by | Carb. acid *per cent.* | Subcarbonate of Soda. | Carb. acid *per cent.* | Subcarbonate of Potass. |
|---|---|---|---|---|---|---|
| Hot w. | Hot w. | steam. | 14.5 | Chocolate br. | 7 | Orange br. |
| ........ | ... ..... | the air | 14.5 | Yellowish br. | | |
| ........ | Cold w. | steam. | 1.5 | Orange br. | 2 | Brick red |
| Cold w. | Hot w. | ........ | 8.0 | Purplish br. | | |
| ........ | Cold w. | ........ | 1.0 | Reddish br. | | |
| ........ | ........ | the air | none | Ochre yel. | | |
| Water kept near 212° for an hour. | | steam. | 1.3 | Blackish br. | 3 | Orange br. |

These differences indicate the precipitates to be mixtures of peroxide, protoxide, and subcarbonate of protoxide of iron, in various proportions. The peroxide is deep red or yellow, as the oxygen is quickly or slowly absorbed; the protoxide is black, and its carbonate brown. When cold water only is used in this process, carbonate of iron remains in the solution, from which the oxide has been precipitated; when hot water is used, part of the carbonic acid is expelled, the subcarbonate is precipitated mixed with oxide; but when heat is long applied, the subcarbonate itself is decomposed, and the precipitate is chiefly oxide. Mr Phillips concludes, that it is more economical to use hot water in every part of the process, and to use potass instead of soda in the preparation.

*Medical use.*—The carbonate of iron is an excellent and safe chalybeate. It may be given in doses of from five grains to sixty; but all chalybeates answer better in small doses, frequently repeated, than in large doses.

SULPHAS FERRI. *Ed.*
*Sulphate of Iron.*

Take of
 Purified filings of iron, six ounces;
 Sulphuric acid, eight ounces;
 Water, two pounds and a half.

Mix them, and after the effervescence ceases, digest the mixture for some time upon warm sand; then strain the decanted liquor through paper, and, after due evaporation, set it aside to crystallize.

*Dub.*

Take of
 Iron-wire, two ounces;
 Sulphuric acid, three ounces and a half, by weight;
 Water, one pint.

Mix the acid by degrees with the water, in a glass vessel, and gradually add the iron-wire, cut into pieces: digest the mixture till the metal be dissolved, and strain the liquor through paper. Lastly, set aside the liquor, after due evaporation, to crystallize by slow refrigeration.

*Lond.*

Take of
 Iron,
 Sulphuric acid, each eight ounces;
 Water, four pints.

Mix the sulphuric acid with the water in a glass vessel, and add the iron; when the effervescence has ceased, strain the solution through paper, and after due evaporation set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

SULPHATE of iron cannot be procured perfectly pure, except by the direct union of sulphuric acid and iron; and as it s of consequence that it should be pure when administered internally, directions for its preparation have been given by all the colleges. The difference which may be observed in the proportions of the materials employed is of little consequence, as sulphuric acid and iron unite only in one proportion.

Iron scarcely acts upon sulphuric acid, unless assisted by heat. It then becomes oxidized, by abstracting oxygen from a portion of the acid, and converting it into sulphureous acid gas or sulphur, and combines with the remainder of the acid. But it acts with great rapidity on diluted sulphuric acid; in

which case it is not oxidized at the expence of the acid itself, but by decomposing the water, and therefore the hydrogen of the water is separated in the form of gas. The action of the acid and iron upon each other often ceases before the acid is nearly saturated, and may be renewed by the addition of a little water. The reason is, that all the water which was not decomposed, is employed to dissolve the sulphate of iron formed.

The properties and uses of sulphate of iron have been already mentioned.

### SULPHAS FERRI EXSICCATUS. *Ed.*
### *Dried Sulphate of Iron.*

Take of

Sulphate of iron, any quantity.

Expose it to the action of a moderate heat in an unglazed earthen vessel, until it become white and perfectly dry.

### SULPHAS FERRI EXSICCATUM. *Dub.*
### *Dried Sulphate of Iron.*

Take of

Sulphate of iron, any quantity.

Let it whiten by exposing it in an unglazed earthen vessel, to a high temperature (200° to 212° Fahr.)

THE heat applied here must not be so great as to decompose the sulphate of iron, but only to deprive it of its water of crystallization.

### OXIDUM FERRI RUBRUM. *Ed.*
### *Red Oxide of Iron.*

Expose dried sulphate of iron gradually to an intense heat, until it is converted into a very red substance.

### *Dub.*

Roast with an intense heat dried sulphate of iron until it become very red. Then wash it, until, according to the test of litmus, the water decanted from it be free of acid; lastly, dry it on blotting paper.

BY the violent heat applied in this preparation, the sulphate of iron is completely decomposed, and copious white fumes are expelled. The iron is converted into the red oxide; part of the sulphuric acid is therefore reduced to the state of sulphureous acid, and the rest of the acid is expelled in a very concentrated state. This process was formerly employed in this country, and still is in Germany, for the preparation o sulphuric acid; which, however, from the presence of the sul-

phureous acid, is possessed of some peculiar properties, such as emitting fumes and crystallizing.

The residuum is composed of red oxide of iron, combined with a little red sulphate of iron, which renders it deliquescent. To obtain the oxide perfectly pure, the residuum must therefore be washed with water, and dried quickly, to prevent the absorption of carbonic acid.

### Tinctura muriatis ferri. *Ed.*
*Tincture of Muriate of Iron.*

Take of
- Purified black oxide of iron in powder, three ounces;
- Muriatic acid, about ten ounces, or as much as may be sufficient to dissolve the oxide.

Digest by a gentle heat, and after the powder is dissolved, add of alcohol, as much as will make the whole quantity of liquor amount to two pounds and a half.

*Dub.*

Take of
- Carbonate of iron, half a pound;
- Muriatic acid, three pounds;
- Rectified spirit, three pints.

Pour the muriatic acid on the carbonate of iron in a glass vessel; and shake the mixture occasionally during three days. Then set it by, that the fæces, if any, may subside, and pour off the liquor; evaporate this to one pint slowly, and when cold, add the spirit.

*Lond.*

Take of
- Subcarbonate of iron, half a pound;
- Muriatic acid, a pint;
- Rectified spirit, three pints.

Pour the acid upon the subcarbonate in a glass vessel, and shake it occasionally for three days. Set it aside, that the dregs, if any, may subside. Pour off the clear liquor, and add to it the spirit.

### Tinctura muriatis ferri cum oxydo rubro. *Dub.*
*Tincture of Muriate of Iron with the Red Oxide.*

Take of
- Red oxide of iron, one ounce;
- Muriatic acid, four ounces by measure;
- Rectified spirit of wine, the requisite quantity.

Digest the oxide with the acid for twenty-four hours, then boil for half an hour. Evaporate the filtered liquor to the thickness of syrup, and when cold, add rectified spirit of wine, with frequent agitation, until the tincture acquire the specific gravity of 1050.

In making this preparation, the colleges use iron in a different state; the Edinburgh, the black oxide; the Dublin, the red oxide; and the London, the carbonate. Mr Phillips observes, that, although the proportions of the London college answer with muriatic acid of specific gravity 1.17, and peroxide of iron, prepared in his method, containing only 3 *per cent.* of carbonic acid, the solution will have acid in excess, when the muriatic acid has only the strength of 1.142, and the carbonate contains 14.5 *per cent.* of carbonic acid, the common state of these substances, as prepared by the directions of the college. Muriatic acid is capable of combining either with the black or red oxides of iron, and forms with each, salts, having distinctive properties.

The red muriate of iron is not crystallizable; has a dark orange colour; is deliquescent; forms a brown-red solution, having a very astringent taste; and is soluble in alcohol. The green muriate is crystallizable; has little colour; is very soluble in water, forming a pale green solution; and is insoluble in alcohol. But the aqueous solution of green muriate attracts oxygen so rapidly from the atmosphere, that unless the access of the air be totally excluded, it is always partially converted into red muriate. The solutions of iron, and of its black oxide, are accordingly found always to contain a greater or less proportion of red muriate, and are therefore not uniform or constant in their properties.

"Having prepared this tincture in the proportions of the London Pharmacopœia, with precipitated carbonate of iron, I found," says Dr Perceval, "that in some instances, when rectified spirit was mixed with the evaporated muriate, crystals of green muriate of iron deposited, which the spirit did not dissolve. The strength of the tincture was consequently variable. This observation suggested the process of Tinctura muriatis ferri cum oxydo rubro, which is now inserted amongst the præp. extemp. of the Dublin Pharmacopœia. The muriatic solution is of an orange-red, and does not crystallize when spirit is added.

"Instead of evaporating it to a certain weight, which is a troublesome operation, spirit is added so as to bring the liquor to a certain specific gravity, which is the standard of the strength of the medicine."

It is an excellent chalybeate, and may be given in doses of

ten or twenty drops twice or thrice a-day, in any proper vehicle.

MURIAS AMMONIÆ ET FERRI. *Dub.*
*Muriate of Ammonia and Iron.*

Take of
Red oxide of iron,
Muriate of ammonia, equal weights.
Mix them thoroughly, and sublime with a sudden and sufficiently great degree of heat.

*Ed.*

Take of
Red oxide of iron, washed and again dried,
Muriate of ammonia, of each equal weights.
Mix them thoroughly, and sublime with a quick fire. Triturate the sublimed matter, and preserve it in a very close phial.

FERRUM AMMONIATUM. *Lond.*
*Ammoniated Iron.*

Take of
Subcarbonate of iron;
Muriate of ammonia, of each one pound.
Mix them accurately; and instantly sublime, by the application of a quick fire; lastly, reduce to powder.

ALTHOUGH, at a low temperature, ammonia decomposes the muriate of iron, at a high temperature iron and its oxides decompose muriate of ammonia. But as muriate of ammonia is itself a volatile salt, great part of it escapes undecomposed; so that the product is a mixture of muriate of ammonia with red muriate of iron. According to the formula of all the colleges, the decomposition is effected by simple affinity. As soon as the oxide of iron acts on the muriate of ammonia, the ammonia which is separated comes over: then, as the heat increases, undecomposed muriate of ammonia is sublimed; which, as the process advances, is mixed with an increasing proportion of muriate of iron. In the former process of the London college, the decomposition was more complex; and a considerable quantity of hydrogen gas was produced. But Mr Phillips says, that the carbonate is unfit for the purpose; for in proportion as it contains carbonic acid, carbonate of ammonia is formed, instead of ammoniaret of iron. The colleges employ a much larger quantity of iron than is necessary. According to the German pharmaceutists,

if the iron be equal to one-sixteenth of the muriate of ammonia, it is sufficient. The new Prussian Dispensatory directs one ounce of iron to be dissolved in a mixture of two parts of muriatic acid, and one of nitrous acid; this solution of red muriate of iron to be mixed with twelve ounces of muriate of ammonia, and the whole evaporated to dryness; and the dry mass to be sublimed in a wide-necked retort, with a heat increased to redness.

Whatever process be employed, the heat must be applied as quickly as possible; and the sublimed product thoroughly mixed by trituration, and kept in well-stopt glass vessels.—It should have a deep orange colour, and a smell resembling saffron, and should deliquesce in the air.

*Medical use.*—This preparation is supposed to be highly aperient and attenuating; though no otherwise so than the rest of the chalybeates, or at most only by virtue of the saline matter joined to the iron. It has been found of service in hysterical and hypochondriacal cases, and in distempers proceeding from a laxity and weakness of the solids, as the rickets. From two or three grains to ten may be conveniently taken in the form of a bolus.

### TINCTURA FERRI AMMONIATI. *Lond.*
*Tincture of Ammoniated Iron.*

Take of
- Ammoniated iron, four ounces;
- Proof-spirit, one pint.

Macerate and strain.

THIS is merely a spiritous solution of the preceding article, and is a much less elegant medicine than the simple tincture of muriate of iron.

### TARTRAS POTASSAE ET FERRI. *Ed.*
*Tartrate of Potass and Iron.*

Take of
- Purified filings of iron, one part;
- Supertartrate of potass, in powder, two parts;
- Water, one part.

Triturate together and expose to the air in an earthen vessel for fifteen days, stirring the mixture daily with a spatula, and adding water from time to time to keep the mass always moist. Then boil the mass for a short time in four times its weight of distilled water, and pour off the solution from its dregs. Evaporate the solution in the heat of a water-bath to dryness, and grind the mass into powder, which is to be kept in very close phials.

FERRUM TARTARIZATUM. *Lond.*
*Tartarized Iron.*

Take of
Iron, one pound;
Supertartrate of potass, in powder, two pounds;
Water, one pint.

Triturate them together, and expose to the action of the air for eight days in a wide glass vessel; then grind the matter, after being dried in a sand bath, to a very minute powder. Add another pint of water to this powder, and set it aside for eight days; then dry the mass, and powder it again.

TARTARUM FERRI. *Dub.*
*Tartar of Iron.*

Take of
Carbonate of iron, half an ounce;
Crystals of tartar, in very fine powder, one ounce;
Distilled water, a pint.

Boil them together in a glass vessel over a slow fire for an hour, and filter the liquor through paper. When cool, and filtered a second time, evaporate it until a pellicle appear on the surface. In cooling, it will form a saline mass, which is to be powdered, and kept in close vessels.

THIS is in fact a triple tartrate of iron and potass, the excess of acid in the supertartrate of potass being saturated by oxide of iron. In the Dublin process the combination is direct; in that of the London college, the iron is oxidized during the process, in which it is moistened and exposed to the action of the air.

Mr Phillips has examined this preparation attentively. He says, that as usually prepared it has a light green colour, and is readily attracted by the magnet, unalterable by exposure to the air, and with difficulty soluble in water, and that one-fifth of the iron-filings employed remain unaltered, so that it must be considered as merely a mixture of metallic iron with supertartrate of potass, coloured by oxide of iron.

Dr Perceval of Dublin says, that when prepared according to the directions of the Irish college, (and the precipitated carbonate was found to answer best,) it forms a mass of concreted spicular crystals of an olive colour, which attracts humidity from the air. In solution it destroys the colour of litmus, and its taste is rather sweetish than sour.

To prepare a real tartarized iron, Mr Phillips digests 32 parts of filings of soft iron in 64 parts of tartar, adding water

occasionally to the mass during the action of the tart·r upon the iron, until it appear by the test of litmus paper that the acid is perfectly saturated. During this process, 15 parts of the iron are dissolved, being converted into nearly 22 parts of peroxide. To this he adds seven times its weight of water, (532 parts,) which easily dissolves the tartarized iron by trituration, forming a solution which readily passes through the filter, and contains one-eighth part of its weight of tartarized iron, or nearly 16 grains of oxide in the fluidounce. This solution is of a deep greenish-brown colour, remains for a great length of time without undergoing any change, except at first the deposition of the tartrate of lime of the tartar. It is precipitated by alcohol, and decomposed by limewater, by solutions of potass and soda and their subcarbonates, when heated, but not when cold; nor by ammonia or its subcarbonate, hot or cold. It is not crystallizable, but when dried is of a dark greenish-brown colour, and attracts moisture from the atmosphere, but does not deliquesce, is exceedingly tenacious, resembling gum, and can scarcely be made to form a perfect solution.

It is evident, that when properly prepared, tartarized iron cannot be exhibited in powder as commonly directed, and the advantage of exhibiting this preparation in solution is, that when the acid is perfectly saturated, the taste of the iron is scarcely perceptible; and hence it can be exhibited with success to persons to whom the common solutions of iron are nauseous. It deserves notice, that when there is acid in excess, the taste of the iron is much more easily detected.

### VINUM FERRI. *Lond.*
### *Wine of Iron.*

Take of
  Iron-filings, two ounces;
  Spanish white wine, two pints.
Mix and set aside for a month, often shaking the vessel, and then filter through paper.

### *Dub.*

Take of
  Iron wire, cut in pieces, four ounces;
  White Rhenish wine, four pints.
Sprinkle the iron with a bottle of the wine, and expose it to the air until it be covered with rust; then add the rest of the wine; digest for seven days, with occasional agitation, and filter.

THIS is merely a solution of the preceding article in wine;

for the iron is only dissolved in the wine by means of the supertartrate of potass it contains. The Rhenish wine directed by the Dublin college will, therefore, dissolve a larger quantity of iron than the Spanish white wine of the London college. A pint of sherry will dissolve only about two grains of carbonate of iron ; but if soft iron be used, about twenty-two grains of peroxide according to Mr Phillips. But a solution of a known proportion of the preceding article in wine will give a medicine of more equal powers, may be made extemporaneously, and is also remarkably permanent.

The dose is from a drachm to half an ounce, repeated twice or thrice a-day in chlorotic cases.

### ACETAS FERRI. *Dub.*
*Acetate of Iron.*

Take of
  Carbonate of iron, half an ounce ;
  Acetic acid, three ounces by measure.
Digest for three days, and strain.

Dr Perceval found, that in experiments made to determine the comparative solubility of iron in its different states in acetic acid, that two drachms of the acid acquired a light amber tinge from ten grains of scales of iron, and left a residuum of $9\frac{1}{2}$ ; a reddish amber colour from iron-filings, residuum $6\frac{3}{4}$ ; a light red from the red oxide, residuum $8\frac{3}{4}$ ; and from the precipitated carbonate a deep claret colour, and the whole was dissolved. Hence the last was preferred for making directly an acetate of iron.

### TINCTURA ACETATIS FERRI. *Dub.*
*Tincture of Acetate of Iron.*

Take of
  Acetate of kali, two ounces ;
  Sulphate of iron, one ounce ;
  Rectified spirit of wine, two pints.
Rub the acetate of kali and sulphate of iron in an earthenware mortar, until they unite into a soft mass ; then dry it with a moderate heat, and triturate it, when dried, with the spirit. Digest the mixture in a well-corked phial for seven days, shaking it occasionally. Lastly, after the fæces have subsided, pour off the limpid liquor.

The acetic acid is capable of combining with both oxides of iron ; and as the iron in the sulphate is in the state of black oxide, which has a strong attraction for oxygen, it is probable that the acetate prepared in the way directed is a mixed acetate.

It has an extremely styptic taste, and is given in doses of thirty or forty drops.

### TINCTURA ACETATIS FERRI CUM ALCOHOL. *Dub.*
### *Tincture of Acetate of Iron with Alcohol.*

Take of
- Acetate of kali, one ounce;
- Sulphate of iron, one ounce;
- Alcohol, one pint.

Rub the acetate of kali and sulphate of iron in an earthenware mortar until they unite into a soft mass; dry this with a moderate heat, and triturate it when dried with the alcohol. Digest the mixture in a well-corked phial for twenty-four hours, shaking it occasionally. Lastly, after the fæces have subsided, pour off the limpid liquor.

ALCOHOL is incapable of dissolving the green salts of iron, but dissolves the red salts readily. This tincture contains a very pure acetate of iron, more perfectly neutralized than most metallic salts. Its extract is of a beautiful crimson colour, which does not crystallize, but first assumes the consistence of wax, and then dries transparent, an ounce measure affording ten grains. A drachm measure gave gr. $\frac{21}{20}$ of prussiate of iron, by precipitation. Dr Perceval has commented upon this preparation at considerable length. In the London Pharmacopœia 1746, a *Tinctura Saturnina* was extracted from a mixture of acetate of lead and sulphate of iron. This was, in fact, a tincture of acetate of iron contaminated with a little lead. Dr Perceval substituted in his practice a preparation of Glauber's, by using equal weights of acetate of potass and sulphate of iron. This tincture, if made with rectified spirit, grows turbid by keeping, and deposites an oxide of iron, which does not happen when alcohol, sp. gr. 0.815, is employed. But Mr Watts discovered, that by using two parts of acetate of potass to one of sulphate of iron, a permanent tincture may be extracted by rectified spirit. Both modes of preparation are inserted in the Dublin Pharmacopœia. That with rectified spirit contains acetate of potass as well as of iron, for its extract is whitish, from a predominance of the former. A drachm measure gave gr. $\frac{16}{20}$ of prussiate of iron, by precipitation. Dr R. Perceval says it is an elegant, agreeable, and useful chalybeate preparation, of which a tea-spoonful or two may be conveniently taken in asses milk.

### Liquor ferri alkalini. *Lond.*
### *Solution of Alkaline Iron.*

Take of
Iron, two drachms and a half;
Nitric acid, two fluidounces;
Distilled water, six fluidounces;
Solution of subcarbonate of potass, six fluidounces.

Mix the water and acid, and pour them upon the iron. As soon as the effervescence has ceased, pour off the acid solution; add this gradually, and at intervals, to the solution of subcarbonate of potass, shaking it occasionally, until after having become of a dark red colour, no more effervescence be excited. Lastly, let it stand for six hours, and pour off the solution.

This preparation of iron is so entirely different from all others in its nature, that we think the London college right in introducing it into their Pharmacopœia. The chemical nature of the composition has not been accurately ascertained, and the preparation is attended with considerable difficulty and uncertainty. Dr Powell says, that the solution of the iron should be made slowly, and that it ought not to be nearly saturated, but have an excess of acid; that it ought to be clear, and slightly greenish, and if, by excess of iron, it have a reddish yellow colour, a little acid is to be added, which will bring it to the proper state; that the acid solution should be added gradually to the alkaline, although it will succeed the other way; and that although the proportions are pretty nearly given, they require to be checked by occasional examination, especially by the taste, which should be slightly alkalescent. He also adds, that after standing, nitrate of potass generally crystallizes, from which the clear deep red solution is to be poured off. Mr Phillips, in his remarks upon this preparation, says, that there is no danger of iron being dissolved in excess, as the acid is capable of dissolving more than twice the quantity of iron ordered; and the solution thus obtained, though so nearly saturated as to excite little effervescence when added to the solution of carbonate of potass, answers perfectly well for making this preparation; but even when the proportions of the college are adopted, the quantity of alkali is too small, and it is necessary to use about one-twelfth more than is directed, in order to dissolve the oxide of iron, although more than requisite to saturate the acid, and to give a decided alkaline taste. Mr Phillips considers it as a solution of peroxide of iron in subcarbonate of potass. Hagen says, that the preparation does

not succeed with caustic potass; and that the more the alkali is carbonated, the better.

Mr Phillips remarks, that if five parts of water be added to one of this preparation, in a few minutes the oxide of iron is almost entirely precipitated, frustrating the probable intentions of the preparation, that of exhibiting iron in solution with an alkali; which, however, may be effected by means of the solution of tartarized iron, which is not decomposed by subcarbonate of potass. Dr Powell, on the contrary, praises this preparation much. He considers it as affording a combination of iron distinct from any other, and often applicable to practice; and adds, "If I was to speak individually of its powers, I should consider them as more considerable than those of any other preparation of the metal in many cases attended with debility of stomach, and it has been also prepared in some large shops, and not unfrequently employed."

## Chap. X.—MERCURY.

### Hydrargyrum purificatum. *Dub.*
*Purified Quicksilver.*

Take of
Quicksilver, six pounds.
Draw off four pounds by slow distillation.

*Lond.*

Take of
Quicksilver, six pounds;
Iron-filings, one pound.
Rub them together, and distil the quicksilver from an iron retort.

*Edin.*

Take of
Quicksilver, six parts;
Filings of iron, one part.
Rub them together, and distil from an iron vessel.

The quicksilver of commerce is often adulterated with lead, tin, or other metals, which renders it unfit for internal use, and for many preparations. It therefore becomes necessary

to purify it, and fortunately, its comparatively great volatility supplies us with an easy process. The Dublin college distil it simply without any addition; but, lest towards the end of the process the mercury should elevate any impurities along with it, they draw off but two-thirds. The principal objection to this process is the want of economy; for although the remaining third may be used for some purposes, its value is very much depreciated. As iron has a much stronger affinity for almost all the substances with which quicksilver may be adulterated, than quicksilver has, by adding iron-filings we may draw off the whole quicksilver by distillation, without any fear of the impurities rising along with it.

Glass retorts are inadmissible in this distillation; because, when the mercury begins to boil, the concussion is so great, that they would certainly be broken. Iron retorts are the best, although strong earthen ones may also be used. The receiver may be of the same materials, or of glass, if we wish to inspect the progress of the operation; but, in this case, we must interpose an adopter between the retort and receiver, and fill the receiver nearly full of water, that the mercury may not crack it, by falling hot into it. The retort employed should be so large, that the quicksilver should not fill above one-third of it.

### ACETAS HYDRARGYRI. *Ed.*
### *Acetate of Quicksilver.*

Take of
- Purified Quicksilver, three ounces;
- Diluted nitrous acid, four ounces and a half, or a little more than may be required for dissolving the mercury;
- Acetate of potass, three ounces;
- Boiling water, eight pounds.

Mix the quicksilver with the acid; and after the effervescence has ceased, digest, if necessary, with a gentle heat, until the quicksilver be entirely dissolved. Then dissolve the acetate of potass in the boiling water, and immediately to this solution, still hot, add the former, and mix them by agitation. Then set the mixture aside to crystallize. Place the crystals, in a funnel, and wash them with cold distilled water; and, lastly, dry them with as gentle a heat as possible.

In preparing the acetate of quicksilver, the whole vessels and funnels used must be of glass.

ACETAS HYDRARGYRI. *Dub.*
*Acetate of Quicksilver.*

Take of
Purified quicksilver, three ounces, by weight;
Diluted nitrous acid, three ounces, by measure;
Acetate of kali, three ounces;
Boiling distilled water, eight pints.

Add the acid to the quicksilver; and after the effervescence has ceased, digest upon hot sand, that the metal may be dissolved. Instantly mix the liquor with the boiling water, in which the acetate of kali has been previously dissolved, and filter, as quickly as possible, through double linen. Let it form crystals by cooling, which, after being washed in cold distilled water, are to be dried on paper, with a very gentle heat.

In the whole of this process glass vessels are to be used.

THESE processes are fundamentally the same. They differ chiefly in the proportions. Those of the Edinburgh college were ascertained by very careful experiment; and if its directions be accurately followed, the preparation succeeds perfectly. Nitrate of mercury is decomposed by acetate of potass; and the products are acetate of mercury and nitrate of potass. The nitrate of potass, being much more soluble than the acetate of mercury, remains in solution after the latter is separated by crystallization. Mercury is capable of forming different combinations with nitrous acid. When we employ a sufficient quantity of acid to dissolve the mercury without the assistance of heat, and to retain it in solution, there is always an excess of acid, and therefore it is a solution of supernitrate of mercury. If we evaporate this solution very gently, or, if we add an additional quantity of mercury, and assist the action of the acid by a gentle heat, until nitrous gas begin to escape, we obtain nitrate of mercury, crystallized in various forms. In these, the mercury is in a state of protoxide. But, if we promote the action of the acid by boiling, until nitrous gas ceases to escape, the mercury is converted into peroxide, and a larger quantity is dissolved. This solution is very apt to crystallize, both on cooling, and by the diminution of the quantity of acid during the process; and if we attempt to dilute the solution with water, a copious precipitate of subnitrate of mercury immediately takes place; and the solution contains supernitrate of mercury. If the dilution be made with cold water, the subnitrate has a white colour, which, by a very slight application of heat, passes to a beautiful yellow,

the colour which it has from the first, when separated by boiling water.

For making the acetate of mercury, the nitrate is prepared with a very gentle heat, and with excess of acid, that it may be retained in perfect solution, and that there may be no possibility of any admixture of subnitrate with the acetate formed. A larger proportion of acid is used by the Edinburgh college, than what was used by the London college; but, by accurate experiment, it was ascertained to be necessary for the success of the process. In mixing the solutions, we must be careful to pour the mercurial solution into that of the acetate of potass, because, by adopting the contrary procedure, the subnitrate of mercury will be precipitated undecomposed, if any peroxide be contained in the mercurial solution. For dissolving the acetate of potass, the London college only used as much water as was capable of retaining the nitrate of potass in solution; the acetate of mercury was therefore precipitated, and was purified by again dissolving it in boiling water, and crystallizing it. This part of the process is simplified by the Edinburgh and Dublin colleges, who use as much water for dissolving the acetate of potass as is capable of retaining, so long as it is hot, the acetate of mercury in solution, and of allowing it to crystallize as it cools. In this way, therefore, it is procured at once sufficiently pure. The exsiccation of the acetate of mercury is an operation of great delicacy; for it is so spongy, that it retains the moisture with great obstinacy; and it is decomposed so easily, that heat can scarcely be employed to dry it. It is best dried by compressing it between several folds of bibulous paper.

The Prussian Dispensatory directs acetate of mercury to be prepared by dissolving two ounces of the red oxide of mercury in about seven ounces of concentrated acetic acid, and evaporating the solution to dryness; but this process affords a salt of a very different nature from those prepared according to the directions of the British colleges, the latter containing protoxide, and being crystallizable, and the former the peroxide, and not crystallizable.

Acetate of mercury is scarcely soluble in cold water, but dissolves readily in boiling water. It generally crystallizes in micaceous plates, like boracic acid, and is extremely easy of decomposition.

It is supposed to be a mild preparation of mercury, and was the active ingredient of the celebrated Keyser's pills. In solution, it has also been recommended externally, to remove freckles and cutaneous eruptions.

MURIAS HYDRARGYRI CORROSIVUS. *Ed.*
*Corrosive Muriate of Quicksilver.*

Take of
Purified quicksilver, two pounds;
Sulphuric acid, two pounds and a half;
Dried muriate of soda, four pounds.

Boil the quicksilver with the sulphuric acid, in a glass vessel, placed in a sand-bath, until a dry mass remain, which when cold is to be mixed in a glass vessel, with the muriate of soda; then sublime in a glass cucurbit, with a heat gradually increased. Lastly, separate the sublimed matter from the scoriæ.

HYDRARGYRI OXYMURIAS. *Lond.*
*Oxymuriate of Quicksilver.*

Take of
Purified quicksilver, two pounds;
Sulphuric acid by weight, thirty ounces;
Dried muriate of soda, four pounds.

Boil the quicksilver with the sulphuric acid, in a glass vessel, until the sulphate of quicksilver be reduced to dryness; triturate this after it has cooled, in an earthen mortar, with the muriate of soda; then sublime it from a glass cucurbit, with a gradually increased heat.

MURIAS HYDRARGYRI CORROSIVUM. *Dub.*
*Corrosive Muriate of Quicksilver.*

Take of
Purified quicksilver, two pounds;
Sulphuric acid, three pounds;
Dried muriate of soda, two pounds and a half.

Dissolve the quicksilver in the acid, and gradually increase the heat, until the mass become perfectly dry; when cold, triturate it in an earthen mortar, with the muriate of soda; then sublime in a proper vessel, with a heat gradually increased.

BY boiling the quicksilver to dryness with sulphuric acid, the metal is oxidized by the decomposition of part of the acid, and combines with the rest to form subsulphate of quicksilver. In the second part of the process the subsulphate is decomposed by dried muriate of soda, muriate of quicksilver sublimes, and sulphate of soda remains behind. In Holland, it is manufactured by subjecting to sublimation a mixture of dried sulphate of iron, nitrate of potass, muriate of soda and quicksilver. Bergman recommends the sublimation of

subnitrate of mercury and muriate of soda; and Mr Murray seems inclined to prefer it to the new process. It is prepared also directly, by dissolving red oxide of mercury in muriatic acid.

Muriate of quicksilver crystallizes by sublimation, in prismatic needles, forming a white semi-transparent ponderous mass. Its taste is acrid, styptic, and durable. It is soluble in 20 parts of cold water, and in 2 at 211°. It is also soluble in 3.8 parts of alcohol, at 70°, and in almost an equal weight of boiling alcohol. It gives a green colour to syrup of violets. It is not altered by exposure to the air, and is sublimed unchanged by heat. It is not decomposed by any of the acids, but is soluble, without alteration, in the sulphuric, nitric, and muriatic acids. It is precipitated by all the alkalies and earths, of an orange-yellow colour, which gradually changes to a brick-red; and, by their carbonates, of a permanent yellow colour. Ammonia forms with it an insoluble, white, triple salt. It is also decomposed by several of the metals. It consists, according to Mr Chenevix, of 69.7 quicksilver, combined with 12.3 of oxygen, and 18 muriatic acid; and, according to Mr Zaboada, of 71.5 quicksilver, combined with 8.5 of oxygen, and 20 muriatic acid. Sir H. Davy has a very different opinion of the nature of this salt. He considers it as a compound of metallic mercury and chlorine, without any oxygen, in the proportion of one of mercury to two of chlorine, or 380 to 134, and in his nomenclature should be called *Mercurana*.

*Medical use.*—Muriate of mercury is one of the most violent poisons with which we are acquainted. Externally, it acts as an escharotic or a caustic; and in solution it is used for destroying fungous flesh, and for removing herpetic eruptions; but even externally it must be used with very great caution. It has, however, been recommended to be given internally by the respectable authorities of Boerhaave and Van Swieten; and it is the active ingredient of all the empirical antivenereal syrups. Were it really capable of curing the venereal disease, or equal in efficacy to the common modes of administering mercury, it would possess many advantages over them in other respects; but that it cannot be depended upon, is almost demonstrated by its use, as an antivenereal, being very much confined to the quacks, and by the testimony of the most experienced practitioners. Mr Pearson says, that it will sometimes cure the primary symptoms of syphilis, especially if it produce considerable soreness of the gums, and the common effects of mercury; but that it will often fail in removing chancre, and where it has removed it, that the

most steady perseverance will not secure the patient from a constitutional affection. It is, on some occasions, however, a useful auxiliary to a mercurial course, in quickly bringing the system under the influence of mercury, and in supporting its action after the use of frictions; and it is peculiarly efficacious in relieving venereal pains, in healing ulcers of the throat, and in promoting the desquamation of eruptions.

### LIQUOR HYDRARGYRI OXYMURIATIS *Lond.*
*Solution of Oxymuriate of Quicksilver.*

Take of
- Oxymuriate of quicksilver, eight grains;
- Distilled water, fifteen fluidounces;
- Rectified spirit, one fluidounce.

Dissolve the oxymuriate of quicksilver in the water, and add to it the spirit.

THIS solution contains in each fluidounce half a grain of the oxymuriate of quicksilver. The spirit is added to preserve the solution from spoiling.

### SUBMURIAS HYDRARGYRI MITIS, sive CALOMELAS. *Ed.*
*Mild Submuriate of Quicksilser,* or *Calomel.*

Take of
- Muriate of quicksilver, four parts;
- Purified quicksilver, three parts.

Triturate finely in a glass mortar, the muriate with a little water, to prevent the acrid powder from rising, then add the quicksilver and triturate again until the mercury be extinguished; and having put the powder, after being dried, into an oblong phial, of which it fills only one-third, sublime from warm sand. Reduce the sublimate to powder, and sublime it a second time. Grind this sublimate into a very minute powder, which is, lastly, to be washed with boiling distilled water.

### SUBMURIAS HYDRARGYRI SUBLIMATUM, sive CALOMELAS. *Dub.*
*Sublimed Submuriate of Quicksilver,* or *Calomel.*

Take of
- Corrosive muriate of mercury, one pound;
- Purified quicksilver, nine ounces.

Rub them together, until the globules disappear, and sublime, with a sufficiently strong heat. Triturate the sublimed matter, and repeat the sublimation. Powder it, and wash

with frequent affusions of distilled water, until the liquor poured off is not affected by some drops of water of carbonate of kali. Then dry.

HYDRARGYRI SUBMURIAS. *Lond.*
*Submuriate of Quicksilver.*

Take of
Oxymuriate of quicksilver, one pound;
Purified quicksilver, nine ounces, by weight.
Rub them together until the globules disappear; then sublime. Take out the sublimed matter, and powder and sublime it a second and a third time. Afterwards triturate the matter into a very subtile powder, as directed for the preparation of chalk.

WHEN quicksilver is triturated with muriate of quicksilver, it abstracts from the oxidized quicksilver of the muriate a part of its oxygen, and the whole mass assumes a blackish-grey colour. When this is exposed to a degree of heat sufficient to convert it into vapour, the action of the different portions of quicksilver upon each other, and upon the muriatic acid, is much more complete; and the whole is converted into a solid white mass, consisting of mercury in a state of less oxidizement, and combined with less acid, than in the muriate, or of about twice the quantity of mercury, with the same quantity of oxygen and acid. According to Sir H. Davy's theory, in the first part of the process, the additional mercury is merely mechanically divided, and by the sublimation twice the quantity of mercury is combined with the same quantity of chlorine.

The trituration of the muriate of mercury is a very noxious operation, as it is almost impossible to prevent the finer particles from rising and affecting the operator's eyes and nostrils. To lessen this evil, the Edinburgh college directs the addition of a little water. In the second part of the process, when the heat is applied, a small portion of quicksilver and undecomposed muriate first arise, and condense themselves in the highest part or neck of the phial; then the submuriate rises, and, being less volatile, condenses in the upper half of the body, while a small quantity of quicksilver, in a state of considerable oxidizement, remains fixed, or near the bottom. The Edinburgh college formerly separated the submuriate from the other matters, and sublimed it again; but now agrees with the other colleges in triturating the whole together again, and resubliming it twice. As in the first sublimation, a portion of the quicksilver and of the muriate of quicksilver always arise undecomposed, a second sublimation is necessary,

especially if we triturate the whole products of the first sublimation together : but any farther repetition of the process is perfectly useless. Lest any portion of muriate should have escaped decomposition, the submuriate must be edulcorated with boiling distilled water, until the water which comes off forms no precipitate with alkalis.

Submuriate of mercury is generally obtained in the form of a white solid mass, but is capable of crystallizing in tetrahedral prisms terminated by pyramids. It has no taste, and is scarcely soluble in water or in alcohol. It is less volatile than muriate of mercury. It is blackened by light, and becomes brown or black when triturated with lime water or the alkalies. It is converted by oxymuriatic acid into muriate of quicksilver. According to Mr Chenevix, it consists of 79 quicksilver, with 9.5 oxygen, and 11.5 muriatic acid; and according to Mr Zaboada, of 85 quicksilver, with 4.4 oxygen, and 10.6 muriatic acid.

From Mr Chenevix's analysis, we should conclude that 54 parts of quicksilver were sufficient to convert 100 of the muriate into submuriate; but, according to Zaboada's, 75 are necessary, which is exactly the proportion directed by the colleges, and is also more conformable to Sir H. Davy's view of their composition; for he considers the muriate, *mercurana*, as consisting of one proportion of mercury 380, and two of chlorine 134, and the submuriate, *mercurane*, of one of mercury 380, and one of chlorine 67; which gives us 73.9 as the quantity of mercury necessary to convert 100 of muriate into submuriate.

*Medical use.*—The submuriate of quicksilver is one of the best mercurials we possess. By proper management it may be made to increase, in a remarkable manner, almost any of the secretions or excretions. One grain mixed with sugar, and snuffed up the nostrils, is recommended as a powerful errhine in amaurosis. The same mixture is blown into the eye, to remove specks from the cornea. Given in doses of one grain morning and evening, or in large doses combined with opium, to prevent it from acting as a purgative, it excites ptyalism. In larger doses of five grains and upwards, it is an excellent purgative. Combined with diuretics, it proves diuretic, and with sudorifics, sudorific.

It is one of the preparations of mercury which is capable of curing syphilis in every form. It also produces very powerful and salutary effects in obstructions and chronic inflammations of the viscera, especially of the liver; and, in general, it is applicable to every case in which mercurials are indicated.

SUBMURIAS HYDRARGYRI PRÆCIPITATUS. *Ed.*
*Precipitated Submuriate of Quicksilver.*

Take of
Diluted nitrous acid,
Purified quicksilver, of each eight ounces;
Muriate of soda, four ounces and a half;
Boiling water, eight pounds.

Mix the quicksilver with the acid, and, towards the end of the effervescence, digest with a gentle heat, frequently shaking the vessel in the meantime. But it is necessary to have added more quicksilver to the acid than it is capable of dissolving, that a perfectly saturated solution may be obtained.

Dissolve at the same time the muriate of soda in the boiling water, and into this solution pour the other while still hot, and mix them quickly by agitation; pour off the saline liquor after the precipitate has subsided, and wash the Submuriate of quicksilver by repeated affusions of boiling water, which is to be poured off each time after the deposition of the submuriate, until the water comes off tasteless.

SUBMURIAS HYDRARGYRI PRÆCIPITATUM. *Dub.*
*Precipitated Submuriate of Quicksilver.*

Take of
Purified quicksilver, seven ounces, by weight;
Diluted nitrous acid, five ounces, by measure.

Pour the acid upon the quicksilver in a glass vessel; and when the mixture has ceased to effervesce, digest in a moderate heat, with occasional agitation, for six hours. Then increase the heat, until the liquor boil a little, which is to be poured off from the quicksilver which remains, and quickly mixed with a boiling solution already prepared, of
Muriate of soda, four ounces;
Water, ten pounds.

Wash the powder which subsides, with warm distilled water, as long as the liquor decanted from it is precipitated by some drops of the liquor of water of carbonate of kali; then dry it.

In the first part of this process, a perfectly saturated solution of nitrate of quicksilver is formed. In the second, there is a mutual decomposition of this nitrate, and of the muriate of soda; nitrate of soda is formed, and muriate of quicksilver with excess of oxide; or, according to Sir H. Davy, the chlorine of the Sodane combines with the mercury of the nitrate, forming mercurane, while the hydrogen of the muriatic acid and the oxygen of the mercurial oxide combine to

form water, nitric acid, and soda. In this preparation, our object is to obtain the insoluble compound which results from the combination of the protoxide of mercury with muriatic acid. In this view, the application of heat, in dissolving the mercury in the nitrous acid, is improper; for a portion at least of the mercury is converted into its peroxide, which occasions, in the first place, the formation of a little subnitrate of mercury, when poured into the saline solution; and, secondly, the formation of a proportion of muriate of mercury (corrosive sublimate,) which must be washed away. Accordingly, Mr Murray has found, that more of mild, and less of corrosive muriate of mercury are formed, when the solution is made slowly and in the cold, than when the directions of the colleges are complied with.

In Sir H. Davy's view of the subject, according to which calomel and corrosive sublimates are compounds of metallic mercury, with different proportions of chlorine, the object in this preparation is to get the largest quantity of mercury dissolved in the nitrous acid, so that in decomposing muriate of soda, the smallest quantity of chlorine may be set at liberty; and as the peroxide contains twice as much oxygen as the protoxide, and acids seem to combine with a certain quantity of oxygen in oxides, whatever be the quantity of metal united with them, the nitrate of the protoxide of mercury will contain twice as much mercury as the nitrate of the peroxide, and will of course give a double proportion of mercury to the chlorine set at liberty by the acid and oxygen.

When properly prepared, the submuriate obtained by precipitation scarcely differs from that obtained by sublimation. Göttling found no other difference than that the precipitated submuriate becomes grey, when triturated with lime-water, whereas the sublimed submuriate becomes black. But he exposed to heat half an ounce of the precipitated submuriate in a subliming apparatus; scarcely a grain of a reddish matter remained fixed; and the sublimed matter now became black when triturated with lime water, and differed in no respect from submuriate prepared in the ordinary way by sublimation. It therefore would seem to be an improvement in the process, to sublime the submuriate after it is precipitated, especially as by that operation it would be most effectually separated from any subnitrate which might be mixed with it.

There is still another way of preparing the submuriate of mercury, which must be noticed. It was contrived by Hermbstædt, and is recommended by Moench, with the confidence

derived from experience, as the very best process for preparing the submuriate of quicksilver.

Take of
 Pure quicksilver, seven ounces and a half;
 Sulphuric acid, four ounces;
 Dried muriate of soda, five ounces and a half.

Distil in a glass retort the sulphuric acid, with four ounces of the quicksilver, until they be converted into a dry white mass. Triturate the sulphate of mercury thus formed, with the remaining three ounces and a half of quicksilver, until the globules disappear; then add the muriate of soda; mix them, and sublime. As the product of the first sublimation still contains unoxidized quicksilver, it is to be again triturated and sublimed. The sublimate being washed, is now pure submuriate of quicksilver, and weighs about six ounces.

The theory of this process is the same with that of the formation of the muriate of quicksilver. The difference between the two products arises from the proportion of quicksilver being greater, and that of the muriate of soda employed being less. We are not prepared to state the comparative economy of these three processes described for preparing submuriate of quicksilver; but of the last process, we may observe, that according to Mr Chenevix's analysis, seven ounces and a half of quicksilver should furnish nine ounces and a half of submuriate of quicksilver; and, according to M. Zaboada's, nearly nine: so that there is evidently a considerable loss, which must be owing either to the formation of muriate of quicksilver, or of oxide of quicksilver.

### Submurias hydrargyri ammoniatum. *Dub.*
### *Ammoniated Submuriate of Quicksilver.*

Add to the liquor decanted from the precipitated submuriate of quicksilver, as much water of caustic ammonia as is sufficient to precipitate the whole metallic salt. Wash the precipitate with cold distilled water, and dry it on blotting paper.

### Hydrargyrum præcipitatum album. *Lond.*
### *White Precipitated Quicksilver.*

Take of
 Oxymuriate of quicksilver, half a pound;
 Muriate of ammonia, four ounces;
 Solution of subcarbonate of potass, half a pint;
 Distilled water, four pints.

Dissolve first the muriate of ammonia, and afterwards the oxymuriate of quicksilver, in the distilled water, and add to these the solution of subcarbonate of potass. Wash the precipitate until it become insipid, and then dry it.

MURIATE of quicksilver is about thirty times more soluble in a solution of muriate of ammonia than in pure water; and, during the solution, there takes place a considerable increase of temperature. Now, as these facts sufficiently prove a reciprocal action of the two salts, and as there is no decomposition, it is evident that they must have combined to form a triple salt, especially as they cannot be again separated either by sublimation or crystallization. This compound may therefore, with propriety, be termed Muriate of Mercury and Ammonia. It is the Sal Alembroth of the alchemists. It is very soluble in water, and is sublimed by heat without decomposition. When to a solution of this salt we add a solution of an alkaline carbonate either of potass, as directed by the London college, or of soda, as by that of Berlin, there occurs a partial decomposition. The alkali combines with a portion of the muriatic acid, and reduces the muriate of mercury and ammonia to the state of a submuriate, which being insoluble, falls to the bottom of the solution. The proportion of muriate of ammonia has been reduced in edition 1815 to one-half, probably in consequence of a remark of Mr Phillips.

The process of the Dublin college is new and well contrived, as it converts to use the washings of the precipitated submuriate, and thus partly obviates the objection of want of economy in the directions given by the college for preparing it. By the simple addition of ammonia, the whole muriate of mercury contained in the washings is precipitated, in the form of submuriate of mercury and ammonia.

The submuriate of mercury and ammonia, thus precipitated, has at first an earthy, and afterwards a metallic taste. It is not soluble in water. It is decomposed by heat, furnishing water, ammonia, and nitrogen gas, while 0.86 of submuriate of mercury remain behind. Sulphuric and nitric acids partially decompose it, and convert it into muriate of mercury, and triple salts of mercury and ammonia. Muriatic acid dissolves it, and converts it into muriate of quicksilver and ammonia. According to Fourcroy's analysis, it consists of

| | |
|---|---|
| 81 | oxide of mercury, |
| 16 | muriatic acid, |
| 3 | ammonia. |
| 100 | |

It is only used for ointments; and its principal recommendation is its white colour.

OXIDUM HYDRARGYRI CINEREUM. *Ed.*
*Ash-coloured Oxide of Quicksilver.*

Take of
Submuriate of mercury, half an ounce;
Lime-water, five pounds.

Boil the submuriate in the lime water for a quarter of an hour in a lightly covered vessel. After it settles, pour off the liquor, and wash the oxide with distilled water, and then dry it.

*Lond.*

Take of
Submuriate of quicksilver, one ounce;
Lime-water, one gallon.

Boil the submuriate of quicksilver in the lime-water, with constant stirring, until the grey oxide subside; wash this with distilled water, and then dry.

PULVIS HYDRARGYRI CINEREUS. *Dub.*
*Ash-coloured Powder of Quicksilver.*

Take of
Quicksilver, two ounces, by weight;
Diluted nitrous acid, two ounces, by measure.

Dissolve the quicksilver with a low heat, and dilute the liquor with eight ounces, by measure, of cold distilled water; then drop it into an ounce and a half, by measure, of the water of carbonate of ammonia, or as much as may be sufficient to precipitate the metal, which is to be washed with warm distilled water, until the decanted liquor is not precipitated by some drops of water of sulphuret of ammonia; and afterwards dry it.

THESE processes, which are essentially the same, are intended to furnish a substitute for the black oxide of quicksilver, on which the efficacy of the mercurials most frequently employed, and most certainly useful, depends. In these, the mercury is oxidized by trituration, in contact with the atmosphere; but the operation is both so tedious and troublesome, that it is often imperfectly performed, or assisted by improper means.

In the latter of these processes it was supposed, that as ammonia has a stronger affinity for nitric acid than oxide of mercury has, it would separate oxide of mercury from its solution in nitric acid; and, therefore, that the precipitate obtained was oxide of mercury, similar to that formed by tri-

turation. But, since the nature of the triple metallic salts has been better understood, this has been discovered to be an error. The grey precipitate which is formed may, generally speaking, be called a subnitrate of mercury and ammonia; for it consists of oxide of mercury and ammonia, not saturated with nitric acid; but, even to ocular inspection, it does not seem to be homogeneous; and, when it is digested in acetic acid, it is partially dissolved, and the residuum acquires a very pale, or almost white colour. The portion dissolved seems to be black oxide, and the white residuum to be pure subnitrate of mercury and ammonia, which, according to Fourcroy, crystallizes in brilliant polyhedral crystals, without smell, of an extremely styptic taste, scarcely soluble in water; is decomposed by heat, by the sulphuric and muriatic acids, and by lime, potass and soda: and consists of 68.20 oxide of mercury, 16 of ammonia, and 15.80 of nitric acid. According to these observations, this preparation ought not to be called the grey oxide of mercury, and is not identical with the black oxide of mercury prepared by trituration. If, however, it answered the same purposes, the identity would be of little consequence; but, from its never having been introduced into general use, although so much more easily prepared, we may presume that it is not equal in point of efficacy.

Black oxide of mercury may, however, be obtained, according to the direction of Saunders, now adopted by the London and Edinburgh colleges, by triturating with lime-water, and subsequent edulcoration, the sublimed submuriate of mercury, or rather the precipitated submuriate, as proposed by Göttling; and that the decomposition may be more easy and complete, I may suggest, that for this preparation the latter submuriate should not be dried, but should be triturated with the lime water as soon as it is edulcorated. This simple black oxide certainly merits a fair trial.

This oxide is said, however, by M. Braamcamp and Sigueira-Oliva, to be prepared in the greatest purity, by boiling the ash-coloured oxide of the Dublin college, long and violently in water, until the triple salt be dissolved or decomposed. The proportion of oxygen, which protoxide of mercury contains, has been very differently estimated by different chemists. Mr Chenevix makes 100 parts of mercury unite with no less than 12 of oxygen, the Portuguese chemists with 8.1, M. Fourcroy with 4.16, M. Sefstrom and Sir H. Davy with 3.95, which last, besides the remarkable coincidence, is the most probable from other reasons.

The Prussian college direct a black oxide of mercury to be prepared, by mixing four ounces of mercury with six ounces

of nitrous acid, diluted with two ounces of distilled water, and occasionally agitating them, without heat, until the acid be saturated. The solution is then to be diluted with distilled water, and water of caustic ammonia to be dropt into it, as long as the precipitate formed is black.

HYDRARGYRUM CUM MAGNESIA. *Dub.*
*Quicksilver with Magnesia.*

Take of
Quicksilver,
Manna, each one ounce;
Magnesia, half an ounce.

Triturate the quicksilver with the manna, in an earthen-ware mortar, adding some drops of water, to give the mixture the consistence of a syrup, until the metallic globules become no longer visible. Then add, with constant trituration, a drachm of the magnesia. After they are thoroughly mixed, add a pint of warm water, and shake the mixture: then let the liquor rest, and decant the fluid from the sediment as soon as it subsides. Repeat this washing twice, that the manna may be totally washed away, and with the sediment still moist, mix the remainder of the magnesia. Lastly, dry the powder on blotting paper.

HYDRARGYRUM CUM CRETA. *Dub.*
*Quicksilver with Chalk,*

Is to be prepared in the same manner, only employing precipitated chalk instead of the magnesia.

*Lond.*

Take of
Purified quicksilver, by weight, three ounces;
Prepared chalk, five ounces.

Triturate them together until the globules disappear.

QUICKSILVER has a strong affinity for oxygen, and absorbs it slowly from the atmosphere. But the combination may be considerably accelerated by agitation, and still more by triturating quicksilver with any substance which promotes its mechanical division, and thus increases its surface. With this view, quicksilver is triturated with viscid substances, as fats, honey, syrup, &c. or with pulverulent substances, as the chalk in the process of the London college.

The black oxide is the mildest, but, at the same time, the most efficacious, of the preparations of mercury. Combined with magnesia or chalk, it is not in general use; but in the

form of the common mercurial pill and ointment, it is more employed than any other preparation of the same metal except calomel.

### Oxydum hydrargyri. *Dub.*
*Oxyde of Quicksilver.*

Take of

Purified quicksilver, any quantity.

Put it into an open glass vessel, with a narrow mouth and wide bottom. Expose this to about the six-hundredth degree of heat, until the metal be converted into red scales.

### Hydrargyri oxydum rubrum. *Lond.*
*Red Oxyde of Quicksilver.*

Take of

Purified quicksilver, by weight, one pound.

Put it into a glass vessel, with a narrow mouth and a broad bottom. Expose this vessel with its mouth open to the six hundredth degree of heat, until the quicksilver be converted into red scales. Then grind them into a very fine powder.

This is an extremely tedious, and therefore expensive, operation, because mercury is incapable of absorbing from the atmosphere the quantity of oxygen necessary to convert it into the red oxide, except when in the state of vapour. But as the form of a vessel which will prevent the dissipation and loss of the mercurial vapour, will, at the same time, hinder the free access and frequent renewal of the air, the operation can only proceed slowly. The vessel most advantageously employed is a wide flat-bottomed matrass, with a very narrow and almost capillary neck. Only so much mercury is introduced into it as will cover the bottom of the matrass; and the vessel is not inserted in the sand deeper than the mercury stands within it. A degree of heat is then applied, sufficient to cause a gentle ebullition in the mercury, which is thus alternately converted into vapour, and condensed again in the upper part of the vessel. While in the state of vapour, it absorbs the oxygen of the air contained in the vessel, by which means it is gradually changed into a black, and then into a red powder; but a complete conversion into the latter state is not effected in less than several months.

Red oxide of quicksilver, thus prepared, consists of small crystalline grains, of a deep red colour, and very brilliant sparkling appearance. By heat, it may be sublimed in the form of a beautiful ruby-coloured vitrified substance. At a

red heat it is decomposed, giving out oxygen gas, while the metal is revived, and is immediately volatilized. It is soluble in several of the acids; and during its solution, it does not decompose them or water It is easily disoxydized. It consists, according to Chenevix, of 100 of mercury and 17.65 oxygen; Zaboada, 11.11; Fourcroy, 8.69; and M. Sefstrom and Sir H. Davy, 7.9; which last is the most probable estimate.

*Medical use.*—It is not only an acrid substance, violently purgative and emetic, but even caustic and poisonous Its internal use is proscribed, but it is applied externally as an escharotic, being previously triturated to a very fine powder; or it is formed into a stimulating ointment with unctuous substances.

OXIDUM HYDRARGYRI RUBRUM per acidum nitricum. *Ed.*
*Red Oxide of Quicksilver by Nitric Acid.*

Take of
Purified quicksilver, three parts;
Diluted nitrous acid, four parts.

Dissolve the quicksilver, and evaporate the solution, with a gentle heat, to a dry white mass; which, after being ground into powder, is to be put into a glass cucurbit, and to have a thick glass plate laid upon its surface. Then, having adapted a capital, and placed the vessel in a sand bath, apply a gradually increased heat, until the matter be converted into bright red scales.

HYDRARGYRI NITRICO-OXIDUM. *Lond.*
*Nitric Oxide of Quicksilver.*

Take of
Purified quicksilver, three pounds by weight;
Nitric acid, one pound and a half by weight;
Distilled water, two pints.

Mix in a glass vessel, and boil until the quicksilver be dissolved, and after the evaporation of the water a white mass remains. Rub this to powder, and put it into another vessel, which must be very shallow; then apply a very gentle heat, and gradually increase it until red vapours cease to be emitted.

OXYDUM HYDRARGYRI NITRICUM. *Dub.*
*Nitric Oxide of Quicksilver.*

Take of
Purified quicksilver, ten ounces, by weight;
Diluted nitrous acid, ten ounces, by measure;

Mix them in a glass vessel, and dissolve the quicksilver, with a heat gradually increased; then augment the fire until the matter remaining in the bottom of the vessel be converted into red scales.

In the first part of these processes, a fully saturated nitrate of mercury is formed. In the second part the metal is oxidized to the maximum by the decomposition of the acid. When a sufficient heat is applied, the nitrate of mercury first melts, then exhales nitrous oxide gas, and changes its colour successively to yellow, orange, and brilliant purple red. If well prepared, it should have a crystalline scaly appearance, sublime entirely at a red heat, and be soluble, without any residuum, in nitrous acid. It contains, according to John, quicksilver, 83.34; oxygen, 16 66; and according to Fourcroy, it contains no nitrous acid, unless a sufficient heat has not been applied; but, according to most other chemists, it contains some nitrous acid; and differs from the red oxide prepared by the action of heat alone in always being more acrid.

This is an extremely difficult operation, and skilful operators not unfrequently fail to obtain it of that brilliant crystalline appearance which is esteemed. M. Paysse, who paid great attention to this preparation in Holland, where it is manufactured in large quantities, gives the following directions:—Dissolve 100 pounds of pure mercury in 140 of pure nitrous acid, of sp. gr. 1.3 to 1.37, promoting their action by a sand bath; evaporate by distillation, and, when the formation of nitrous gas indicates the decomposition of the nitrate of mercury, remove the receiver, and apply a steady and moderate heat for about eight hours, until a match, which has been just blown out, inflames, on being introduced into the matrass, which is a proof that the operation is finished. To its success it is necessary, 1. That the nitrous acid be not mixed with muriatic; 2. That it be sufficiently strong; 3. That the evaporation be conducted with a moderate heat; 4. That the vessel be sufficiently large and flat, so that a large surface be exposed, and the whole equally heated; 5. That the heat be gradually augmented; and, lastly, That it be steadily maintained the whole time. Turf is the fittest fuel.

*Medical use.*—It is only used as an escharotic, and care must be taken that it is finely levigated, otherwise it only irritates, without destroying the parts to which it is applied. It is a very common application to chancres.

SUBSULPHAS HYDRARGYRI FLAVUS. *Ed.*
*Yellow Subsulphate of Quicksilver.*

Take of
Purified quicksilver, two parts;
Sulphuric acid, three parts.

Put them into a glass cucurbit, and boil them in a sand-bath to dryness. Reduce to powder the white matter which is left in the bottom, and throw it into boiling water. A yellow powder will immediately be produced, which must be frequently washed with warm water.

OXYDUM HYDRARGYRI SULPHURICUM. *Dub.*
*Sulphuric Oxyde of Quicksilver.*

Take of
Purified quicksilver, one pound;
Sulphuric acid, a pound and a half.

Dissolve in a glass vessel, with a sufficient heat, which is to be gradually increased until the matter be entirely dried. This, upon pouring on it a very large quantity of warm water, will immediately become yellow, and fall into powder, which is to be well triturated with this water, in an earthenware mortar.

After pouring off the supernatant liquor, wash the powder with warm distilled water, as often as the decanted liquor forms a precipitate, on the addition of some drops of the water of subcarbonate of kali; and, lastly, dry it.

THE action of sulphuric acid on mercury has been examined with considerable attention by Fourcroy. In the cold, they have no action on each other; but on the application of heat, the sulphuric acid begins to be decomposed, sulphureous acid gas is extricated, and the metal is oxidized, and combines with the undecomposed acid, forming with it a white saline mass, covered with a colourless fluid. In this state it reddens vegetable blues, is acrid and corrosive, does not become yellow by the contact of the air, and is not decomposed by water either warm or cold. It is therefore supersulphate of quicksilver, and the proportion of the acid in excess is variable.

By washing the saline mass repeatedly with small quantities of water, it is at last rendered perfectly neutral. It no longer reddens vegetable blues. It is white; it crystallizes in plates, or in fine prismatic needles; it is not very acrid; it is not decomposed either by cold or boiling water, but is soluble in 500 parts of the former, and in about 250 of the latter. It is

much more soluble in water acidulated with sulphuric acid. The following estimates of its composition have been made :

| | Fourcroy. | Braamcamp and Sigueira. |
|---|---|---|
| Quicksilver, | 75. | 57.42 |
| Oxygen, | 8. | 6.38 |
| Sulphuric acid, | 12. | 31.8 |
| Water, | 5. | 4.4 |
| | 100. | 100. |

But if, instead of removing the excess of acid from the supersulphate of quicksilver, by washing it with water, we continue the action of the heat according to the directions of the colleges, there is a copious evolution of sulphureous acid gas, and the saline residuum is converted into a white mass, which therefore evidently contains both a larger proportion of mercury, and in a state of greater oxidizement, than the salt from which it was formed. But this white saline mass is farther analysed by the affusion of hot water; for one portion of it is dissolved, while the remainder assumes the form of a beautiful yellow powder. The portion dissolved is said to contain excess of acid. The yellow powder is, on the contrary, a subsulphate.

The subsulphate of quicksilver has a bright yellow colour, a considerably acrid taste, is soluble in 2000 parts of cold water, is also soluble in sulphuric acid slightly diluted, is decomposed by the nitric acid, and forms muriate of quicksilver with the muriatic acid, while the neutral sulphate forms submuriate. It oxidizes quicksilver, and is converted by trituration with it into black powder. At a red heat it gives out oxygen gas, and the metal is revived. It consists of

| | Fourcroy. | Braamcamp and Sigueira. |
|---|---|---|
| Quicksilver, | 76. | 73.23 |
| Oxygen, | 11. | 8.47 |
| Sulphuric acid, | 10. | 15. |
| Water, | 3. | 3. |
| | 100. | 100. |

*Medical use.*—It is a strong emetic, and with this intention operates the most powerfully of all the mercurials that can be safely given internally. Its action, however, is not confined to the primæ viæ; it will sometimes excite salivation, if a purgative be not taken soon after it. It is used in virulent gonorrhœas and other venereal cases, where there is a great flux of humours to the parts. But its chief use, at present, is in swellings of the testicles from a venereal affection; and

it seems not only to act as a mercurial, but also, by the severe vomiting it occasions, to perform the office of a discutient, by accelerating the motion of the blood in the parts affected. It is said likewise to have been employed with success, in robust constitutions, against leprous disorders, and obstinate glandular obstructions : the dose is from two grains to six or eight. It may be given in doses of a grain or two as an alterative and diaphoretic. Dr Hope senior found, that in doses of one grain, with a little powder of liquorice root, it forms a very convenient errhine.

This medicine has been recommended as the most effectual preservative against hydrophobia.

On the whole, however, we consider it as a superfluous preparation, whose place may be more safely supplied by other mercurials or emetics.

### Hydrargyri sulphuretum nigrum. *Lond.*
### *Black Sulphuret of Quicksilver.*

Take of
Purified quicksilver, one pound, by weight ;
Sublimed sulphur, one pound.
Triturate then together until the globules disappear.

### Sulphuretum hydrargyri nigrum. *Ed.*
### *Black Sulphuret of Quicksilver.*

Take of
Purified quicksilver,
Sublimed sulphur, each equal weights.
Grind them together in a glass mortar, with a glass pestle, till the mercurial globules totally disappear.

It is also prepared with twice the quantity of quicksilver.

### *Dub.*

Take of
Purified quicksilver,
Sublimed sulphur, equal weights.
Triturate them together in a stoneware mortar until the globules disappear.

This process, simple as it appears, is not, even in the present advanced state of chemistry, perfectly understood. It was formerly imagined, that the quicksilver was merely mechanically divided, and intimately mixed with the sulphur. But that they are really chemically united is indisputably proved by the insolubility of the compound in nitrous acid. Fourcroy is of opinion, that during the trituration, the mercury absorbs oxygen, and is converted into the black oxide,

and that in this state it is slightly combined with the sulphur. The editors of Gren also suppose it to be in the state of black oxide, but that it is combined with hydroguretted sulphur; and they direct a little water to be added during the trituration, that by its decomposition it may facilitate the process.

The black sulphuret of quicksilver, thus prepared by trituration, has a pulverulent form, is insoluble in nitric acid, is totally soluble in solution of potass, and is precipitated unchanged from this solution by acids. It is not altered by exposure to the air; and when heated in an open vessel, it emits sulphureous acid gas, acquires a dark violet colour, and, lastly, sublimes in a brilliant red mass, composed of crystalline needles.

The combination of quicksilver with sulphur may be much more speedily affected by the assistance of heat, by pouring the mercury, previously heated, upon the sulphur in a state of fusion, and stirring them until they cool, and form a consistent mass, which may be afterwards powdered. The sulphuret prepared by fusion differs, however, from that prepared by trituration; for it is not soluble in a solution of potass, but is converted by long ebullition in it into the red sulphuret, and it also reddens spontaneously, in course of time, from the action of the air.

Black sulphuret of mercury may be also prepared in the humid way, as it is called, by precipitation, or even by direct solution. According to Berthollet, mercury agitated with sulphuretted hydroguret of ammonia forms a black sulphuret exactly resembling that prepared by trituration; but if hydroguretted sulphuret of ammonia be used, the black precipitate formed gradually assumes a red colour, and the solution contains sulphuretted hydroguret of ammonia. The same phenomena take place with all the mercurial salts.

*Medical use.*—As a medicine, black sulphuret of quicksilver possesses no very evident effects. It is principally used as an alterative in glandular affections, and in cutaneous diseases. It has been commonly given in doses of from 5 to 10 grains; but even in doses of several drachms, and continued for a considerable length of time, it has scarcely produced any sensible effect.

### SULPHURETUM HYDRARGYRI RUBRUM. *Dub.*
### *Red Sulphuret of Quicksilver.*

Take of
Quicksilver, purified, forty ounces;
Sublimed sulphur, eight ounces.

Mix the quicksilver with the melted sulphur; and if the mix-

ture take fire, extinguish it by covering the vessel; afterwards reduce the mass to powder, and sublime it.

*Lond.*

Take of
Purified quicksilver, forty ounces;
Sublimed sulphur, eight ounces.

Mix the quicksilver over the fire with the melted sulphur; and as soon as the mass swells up, remove the vessel from the fire, and cover it strongly, to prevent it from catching fire; then powder it and sublime.

As soon as the mercury and sulphur begin to unite, a considerable explosion frequently happens, and the mixture is very apt to take fire, especially if the process be somewhat hastily conducted. This accident the operator will have previous notice of, from the matter swelling up, and growing suddenly consistent; as soon as this happens, the vessel must be immediately close covered.

During the sublimation, care must be had that the matter do not rise into the neck of the vessel, so as to block it up and cause it to burst. To prevent this, a wide-necked bolthead, or rather an oval earthen jar, coated, should be chosen for the subliming vessel. If the former be employed, it will be convenient to introduce at times an iron-wire, somewhat heated, in order to be the better assured that the passage is not blocking up; the danger of which may be prevented by cautiously raising the vessel higher from the fire.

If the ingredients be pure, there is no residuum. In such cases, the sublimation may be known to be over, by introducing a wire as before, and feeling with it the bottom of the vessel, which will then be perfectly smooth: if any roughness or inequalities be perceived, either the mixture was impure, or the sublimation is not completed; if the latter be the case, the wire will soon be covered over with the rising cinnabar.

M. M. Tuckert and Paysse have described, from actual observation, the process followed in the manufactory of M. Brand at Amsterdam, where 48,000 pounds of cinnabar are annually prepared. 150 pounds of sulphur are mixed with 1080 pounds of mercury, and exposed to a moderate heat in a bright iron-kettle, one foot deep, and two and a half in diameter. The black sulphuret of mercury, thus produced, is reduced to powder, and put up in earthen pots capable of containing about a quart of water. The subliming apparatus consists of three large coated crucibles, bound with iron, and surmounted with domes of iron, through the top of which the black sulphuret is introduced. These are built into a furnace,

in such a manner that two-thirds of each apparatus is exposed to the action of the flame, which circulates freely around them. The fuel made use of is turf, which is found preferable to all others, probably from its affording a steady and moderate heat. The fire is kindled in the evening; and when the crucibles have become red, the pots containing the black sulphuret are emptied successively into them, at first one into each, and afterwards two, three or more, at a time, according to the violence of the inflammation which succeeds. Sometimes the flame rises four, or even six feet above the domes; when its violence is a little abated, the aperture is covered closely up with a lid of iron. In this manner the whole quantity is introduced into the three crucibles in about thirty-four hours. The fire is steadily supported in a proper degree for thirty-six hours, and the sublimation assisted by stirring the matter every quarter of an hour with a triangle of iron, until the whole is sublimed, when the fire is allowed to expire. The colour of the flame changes during the process from a dazzling white to a yellow white, orange yellow, blue and yellow, green, violet, and blue and green. When it acquires a fine sky-blue, or indigo colour, and rises only an inch or two above the aperture, the aperture is closed hermetically, and luted with clay and sand. After the apparatus has cooled, 400 pounds of sublimed red sulphuret of mercury are found in each, so that there is a loss of 30 pounds on the 1230 of materials employed. The process by which cinnabar is converted into vermilion is kept a secret by the Dutch; but M. Paysse discovered, that by keeping some levigated cinnabar in the dark, covered with water, and stirred frequently for a month, it acquires the brilliant colour of Chinese vermilion.

When taken out of the subliming vessels, the red sulphuret of quicksilver is a brilliant crystalline mass, and first acquires its very rich colour when reduced to the form of a fine powder by trituration. It has neither smell nor taste, and is insoluble in water and in alcohol. In close vessels it sublimes entirely unchanged, but requires for this purpose a considerable degree of heat. It is not soluble in any acid, and is only decomposed by the nitro-muriatic, which dissolves the quicksilver, and separates the sulphur. It is not decomposed by boiling it with solutions of the alkalis, but is decomposed by melting it with potass, soda, lime, iron, lead, copper, antimony and several other metals. Proust has proved that it consists of 85 quicksilver, and 14 or 14½ sulphur, and that the quicksilver is not oxydized to a maximum, as had been falsely supposed, but is in its metallic state. His analysis is

confirmed by the other methods by which cinnabar may be prepared. Thus, the black sulphuret of quicksilver, by fusion, is converted into the red sulphuret, by boiling it in a solution of potass, which can only act by dissolving the sulphuretted hydrogen and superfluous sulphur. Also submuriate, or subsulphate of mercury, sublimed with sulphur, furnish red sulphuret of mercury, and muriate or sulphate of mercury.

*Medical use.*—Red sulphuret of quicksilver is sometimes used in fumigations against venereal ulcers in the nose, mouth, and throat. By inhaling the fumes produced by throwing half a drachm of it on red-hot iron, a violent salivation has been produced. This effect is by no means owing to the medicine as a sulphuret; for, when set on fire, it is no longer such, but mercury resolved into vapour, and blended with the sulphureous acid gas; in which circumstances, this mineral has very powerful effects.

Mr Pearson, from his experiments on mercurial fumigation, concludes, that where checking the progress of the disease suddenly is an object of great moment, and where the body is covered with ulcers, or large and numerous eruptions, and, in general, to ulcers, fungi, and excrescences, the vapour of mercury is an application of great efficacy and utility; but that it is apt to induce ptyalism rapidly, and great consequent debility; and that, for the purpose of securing the constitution against a relapse, as great a quantity of mercury must be introduced into the system by inunction, as if no fumigation had been employed.

## Chap. XI.—LEAD.

### Acetas plumbi. *Dub.*
*Acetate of Lead.*

Take of
- Subacetate of lead, called ceruse, any quantity;
- Distilled vinegar, ten times its weight.

Digest in a glass vessel, until the vinegar become sweet. Having poured this off, add more vinegar, until it cease to become sweet. Filter the liquor, and crystallize by alternate slow evaporation and refrigeration. The crystals are to be dried in the shade.

ACETAS PLUMBI, olim SACCHARUM SATURNI. *Ed.*
*Acetate of Lead*, formerly *Sugar of Lead.*

Take of
White oxide of lead, any quantity;
Distilled acetic acid, a sufficient quantity.

Pour upon the oxide, put into a cucurbit, ten times its weight of acid.

Let the mixture stand upon warm sand till the acid becomes sweet, which is then to be poured off, and fresh acid added until it cease to become sweet; then evaporate all the liquor, defaecated, in a glass vessel, to the consistence of thin honey, and set it aside in a cold place, that crystals may be formed, which are to be dried in the shade. The remaining liquor is again to be evaporated, that new crystals may be formed; and the evaporation is to be repeated until no more crystals concrete.

SUPERACETAS PLUMBI. *Lond.*
*Superacetate of Lead.*

Take of
Carbonate of lead, one pound;
Acetic acid, one gallon and a half.

Boil the carbonate of lead with the acid, until this be saturated; then filter through paper, and, after evaporation, till a pellicle be formed, set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

THE acetate of lead is seldom prepared by the apothecary, as he can procure it at an infinitely cheaper rate from those who manufacture it in large quantities, and render it perfectly fit for medicinal use, by solution and crystallization. The preparation of it, as directed by the colleges, is a case of simple solution. The process frequently fails, from the oxide of lead employed being adulterated with carbonate of lime, or some other earthy substance. The acetic acid employed should be as strong as can be procured; for with a weak acid the product of pure salt is small, and the quantity of mother-water is increased. The addition of a small quantity of alcohol to the solution, after it has been duly evaporated, is said to improve the beauty of the crystals. The mother-water (which probably is essentially the same with Goulard's extract of lead,) may also be made to furnish pure crystals, by adding to it a fresh portion of acetic acid; for, without that precaution, it furnishes only a very heavy, yellow, pulverulent mass.

The manufacture of acetate of lead is conducted more economically when the oxide is dissolved in the acid at the same time that it is prepared, which is done by alternately exposing

plates of lead to the vapour of acetic acid, and immersing the plates, thus covered with oxide, into the acid itself.

Acetate of lead has a sweet styptic taste. It has a white colour, and crystallizes in flat parallelopipeds, terminated by a wedge, or more commonly in shining needles. It is soluble in water and in alcohol; effloresces slightly in the air, and is decomposed by heat and light. It is decomposed by the alkalies, and most of the earths and acids.

*Medical use.*—The internal use of acetate of lead, notwithstanding the encomiums some have been rash enough to bestow upon it, is entirely to be rejected. It forms, however, a very valuable external application in superficial and phlegmonic inflammations, bruises, and diseases of the skin. It is always applied in solution, either simply, or by means of cloths soaked in it, or mixed with bread-crumb. A drachm, with five ounces of any distilled water, forms a strong solution, and with ten ounces of water, a weak solution. If common water be used, the addition of about a drachm of acetic acid will be necessary to keep the lead in solution.

### Liquor subacetatis lithargyri. *Dub.*
*Solution of Subacetate of Litharge.*

Take of
Litharge, one pound;
Distilled vinegar, eight pints.

Boil to six pints in a glass vessel, with continual agitation; pour off the liquor after the fæces have subsided, and strain it.

### Liquor plumbi subacetatis. *Lond.*
*Solution of Subacetate of Lead.*

Take of
Semivitrified oxide of lead, two pounds;
Acetic acid, one gallon.

Mix and boil to six pints, constantly stirring, then set it aside, until the fæces have subsided, and strain.

Mr Phillips thinks, that too much litharge is employed by the London college in this preparation, as a gallon of distilled vinegar, sp. gr. 1.007, will dissolve only ten of the twenty-four ounces ordered, and the residuum having its bulk much increased by the action of the acid, retains much of the solution. When properly prepared, it is of a straw colour, with a slight admixture of green, and has a sp. gr. of 1.22, and it is not, as said by Dr Powell, "a dense solution of a deep brown colour," unless the acid which remains after the

distillation of vinegar be employed instead of the distilled vinegar.

Notwithstanding Scheele shewed that a solution of sugar of lead was converted into Goulard, by allowing it to act for a day on a plate of lead, yet, until the experiments of Dr Bostock, it was generally believed that these preparations did not differ, except in the accidental variations of strength to which the latter was subject. By his analysis, however, it appears that the constituents in the saturated solution of the sugar of lead, and of the water of acetated litharge, are respectively,

| | Former. | Latter. |
|---|---|---|
| Oxide of lead, - | 16.8 | 23.1 |
| Acetic acid, - | 7.5 | 5. |
| Water, - - | 75.7 | 71.9 |
| | 100. | 100. |

Thenard obtained the salt in crystallized plates, by boiling 150 parts of litharge in a solution of 100 parts of sugar of lead, and on analysing it found it to consist of 17 acid, 78 oxide, and 5 water. These experiments, the coincidence of which confirm their accuracy, shew, that in the sugar of lead, 100 parts of acid are combined with 224 of oxide of lead, and in Goulard's extract, with 450 or 460, or somewhat more than twice the quantity of oxide. Now, according to the doctrine of definite proportions, any acid always combines with the same proportion of oxygen in oxides, whatever the proportion of metal may be: it is therefore evident, that the oxygen in the oxide of lead, contained in Goulard's extract, is combined with twice as much lead as it is in the oxide in the sugar of lead; or Goulard's extract is the acetate of the protoxide of lead, and sugar of lead the acetate of the peroxide of lead.

### LIQUOR SUBACETATIS LITHARGYRI COMPOSITUS. *Dub.*
*Compound Solution of Subacetate of Litharge.*

Take of
  Liquor of acetated litharge, two drachms by weight;
  Distilled water, two pints;
  Weaker spirit of wine, two drachms by measure.
Mix the spirit and liquor of acetated litharge, then add the Distilled water.

### LIQUOR PLUMBI ACETATIS DILUTUS. *Lond.*
*Diluted Solution of Acetate of Lead.*

Take of
  Solution of subacetate of lead, one fluidrachm;

Distilled water, one pint;
Proof-spirit, one fluidrachm.
Mix.

## Chap. XII.—TIN.

### Stanni pulvis. *Dub.*
*Powder of Tin.*

Take of
Tin, any quantity.
Having melted it over the fire in an iron mortar, agitate it until it be reduced to powder, which is to be passed, when cold, through a sieve.

The college of Edinburgh do not give this preparation, inserting *Limatura et Pulvis Stanni* in their list of the materia medica.

*Med. use.*—It is occasionally employed as a remedy against worms, particularly the tænia. The general dose is from a scruple to a drachm; some confine it to a few grains; but Dr Alston assures us, that its success chiefly depends on its being given in much larger quantities. He directs an ounce of the powder to be taken on an empty stomach, mixed with four ounces of molasses; next day, half an ounce; and the day following, half an ounce more; after which a cathartic is administered. He says, the worms are usually voided during the operation of the purge, but that pains of the stomach occasioned by them are removed almost immediately upon taking the first dose of the tin. This practice is sometimes successful in the expulsion of tæniæ, but by no means so frequently as Dr Alston's observations would lead us to hope.

## Chap. XIII.—ZINC.

### Oxidum zinci. *Ed.*
*Oxide of Zinc.*

Let a large crucible be placed in a furnace filled with live coals, so as to be somewhat inclined towards its mouth;

and when the bottom of the crucible is moderately red, throw into it a bit of zinc, about a drachm in weight. The zinc soon inflames, and is, at the same time, converted into white flakes, which are to be from time to time removed from the surface of the metal with an iron spatula, that the combustion may be more complete; and at last, when the zinc ceases to flame, the oxide of zinc is to be taken out of the crucible. Having then put in another piece of zinc, the operation is to be repeated, and may be repeated as often as is necessary. Lastly, the oxide of zinc is to be prepared in the same way as the carbonate of zinc.

*Dub.*

Take of

Zinc, broken into pieces, any quantity.

Throw it at different times into a sufficiently deep crucible, heated red hot, and placed with its mouth inclined towards the mouth of the furnace. After each time that any zinc is thrown in, cover the crucible with another inverted over it, but loosely, so that the air may have access to the zinc. Preserve the white and very light sublimed powder for use.

*Lond.*

Inject successively small pieces of zinc into a large, deep crucible, heated to whiteness. It must be inclined to one side, and covered with another crucible, so that the zinc may be exposed to the action of the air, and may be stirred with an iron spatula. Immediately take out the oxide, which arises from time to time, and pass its white and lighter part through a sieve. Pour water upon this, and reduce it to an impalpable powder, as directed for the preparation of chalk.

This is an instance of simple oxidizement. At a red heat, zinc attracts the oxygen of the atmosphere so strongly, that it is quickly covered with a crust of white oxide, which prevents the air from acting on the metal below; and therefore we are desired to operate only on small pieces at a time, and to place the crucible, so that we may easily take out the oxide formed, and introduce fresh pieces of zinc. As soon as the crust of oxide is broken, or removed, the zinc inflames, and burns with a brilliant white, or greenish blue flame, being at the same time converted into very light flocculi. To save these as much as possible, we are directed to use a very deep and large crucible, and to cover it with an inverted crucible. But as we must not cover it, so as to prevent the access of the air, it is doubtful whether the latter precaution be of much service.

The greater part of the zinc is, however, oxidized in the crucible, without being previously converted into vapour; and as this portion of the oxide is always mixed with particles of zinc, it is necessary to separate them by trituration and elutriation.

The oxide thus obtained is of a pure white colour, without smell or taste, infusible and fixed in the fire, insoluble in water or alcohol, and entirely soluble in acids. The presence of lead in it is detected by sulphuric acid, which forms, in that case, an insoluble sulphate of lead. The white oxide of zinc contains 82.15 zinc, and 17.85 oxygen.

Mr Phillips recommends, instead of this tedious process, an oxide, or rather a subcarbonate prepared by decomposing sulphate of zinc by subcarbonate of potass. "If solutions, consisting of about eight parts of the former and five of the latter, be boiled together for a short time, a very light white precipitate is obtained, containing about 12 *per cent.* of carbonic acid. Should the sulphate of zinc be contaminated with oxide of iron, it may be separated by potash previous to the precipitation of the oxide of zinc by the subcarbonate."

*Medical use.*—White oxide of zinc is applied externally as a detergent and exsiccant remedy. With twice its weight of axunge, it forms an excellent application to deep chops, or excoriated nipples. But, besides being applied externally, it has also, of late, been used internally. In doses from one to seven or eight grains, it has been much celebrated in the cure of epilepsy, and several spasmodic affections; and there are sufficient testimonies of its good effects, where tonic remedies in those affections are proper.

### CARBONAS ZINCI IMPURUS PRÆPARATUS. *Ed.*
### *Prepared Impure Carbonate of Zinc.*

The impure carbonate of zinc, after being roasted by those who make brass, is to be pulverized in an iron mortar, and levigated on a porphyry stone with a little water, and then put into a capacious vessel and water poured upon it, which, after frequent agitation, is to be poured off while loaded with minute powder. The subtile powder, which subsides, on allowing the water to stand at rest, is to be dried.

### LAPIS CALAMINARIS PRÆPARATUS. *Dub.*
### *Prepared Calamine.*

Reduce calcined calamine to powder, and separate the impalpable parts in the same manner that is directed in the preparation of chalk.

### CALAMINA PRÆPARATA. *Lond.*
*Prepared Calamine.*

Burn the calamine; then triturate it; lastly, reduce it to an impalpable powder, in the manner directed for the preparation of chalk.

As this oxide of zinc is intended for external application, and often to parts very easily irritated, too much pains cannot be bestowed in reducing it to an impalpable powder.

### OXIDUM ZINCI IMPURUM PRÆPARATUM. *Ed.*
*Prepared Impure Oxide of Zinc.*

It is prepared as the impure carbonate of zinc.

THIS oxide is also prepared for external use only.

### SULPHAS ZINCI. *Ed.*
*Sulphate of Zinc.*

Take of
Zinc, cut into small pieces, three parts;
Sulphuric acid, five parts;
Water, twenty parts.

Mix them, and when the effervescence is finished, digest the mixture, for a little, on hot sand; then strain the decanted liquor through paper, and, after proper evaporation, set it apart, that it may crystallize.

*Dub.*

Take of
Zinc, reduced to powder, in the manner directed for the powder of tin, three ounces;
Sulphuric acid, five ounces;
Water, one pint.

Put the zinc in a glass vessel, and gradually pour on it the acid previously diluted with the water. After the effervescence has ceased, digest a little; and, after due evaporation of the filtered liquor, set it aside to crystallize.

*Lond.*

Take of
Zinc, broken into bits, three ounces;
Sulphuric acid, five ounces, by weight;
Water, four pints.

Mix in a glass vessel; and after the effervescence has ceased, strain the solution through paper, then evaporate to a pellicle, and set it aside to crystallize.

Sulphate of zinc is chiefly found native in the mines of Goslar, sometimes in transparent pieces, but more commonly in the form of white efflorescences, which are dissolved in water, and afterwards reduced, by evaporation and crystallization, into large masses. But the sulphate of zinc of commerce is never pure, always containing iron, copper, and a little lead. From the mode of its preparation, there is also a deficiency of acid and water of crystallization. The means formerly directed for purifying it by the London college supplied these, but did not separate the foreign metals, except perhaps the lead. If, therefore, a pure sulphate of zinc be wanted, we may, according to the direction of the colleges, dissolve pure zinc in pure sulphuric acid; but we believe this process is very rarely practised, especially as the common sulphate of zinc may be sufficiently purified by exposing it in solution to the air, by which means red oxide of iron is precipitated, and by digesting it upon pure zinc, which precipitates the other metals.

Sulphate of zinc crystallizes in tetrahedral prisms, terminated by pyramids. It has a metallic styptic taste; effloresces slowly when exposed to the air. It is soluble in 2.5 parts of water, at 60°, and in much less boiling water. It is not soluble in alcohol. It is decomposed by the alkalies, earths, and hydro-sulphurets. It consists of 20 oxide of zinc, 40 acid, and 40 water of crystallization.

*Medical use.*—Sulphate of zinc, in doses from ten grains to half a drachm, operates almost instantly as an emetic, and is at the same time perfectly safe. It is therefore given when immediate vomiting is required, as in cases where poison has been swallowed. By employing it internally, in smaller doses, it acts as a tonic; and some think it, in every case, preferable to the oxide of zinc.

Externally, it is used as a styptic application, to stop hæmorrhagies, diminish increased discharges, as gonorrhœa, and to cure external inflammations, arising from debility and relaxation of the blood-vessels, as in some cases of ophthalmia. It is often prescribed in injections and collyria.

### Solutio sulphatis zinci. *Ed.*
### *Solution of Sulphate of Zinc.*

Take of
- Sulphate of zinc, sixteen grains;
- Water, eight ounces;
- Diluted sulphuric acid, sixteen drops.

Dissolve the sulphate of zinc in the water; then, having added the acid, filter through paper.

The acid is here added to dissolve the excess of oxide of zinc, which the common sulphate often contains. This solution is of a strength proper for injecting into the urethra, in gonorrhœa, or applying to the eyes in chronic ophthalmia.

### Liquor aluminis compositus. *Lond.*
### *Compound Solution of Alum.*

Take of
Alum,
Sulphate of zinc, of each half an ounce ;
Boiling water, two pints.
Dissolve the alum and sulphate of zinc together in the water, and filter through paper.

This water was long known in our shops under the title of *Aqua aluminosa Bateana.*

It is used for cleansing and healing ulcers and wounds, and for removing cutaneous eruptions, the part being bathed with it hot three or four times a-day. It is sometimes likewise employed as a collyrium, and as an injection in gonorrhœa and fluor albus, when not accompanied with virulence.

### Solutio acetatis zinci. *Ed.*
### *Solution of Acetate of Zinc.*

Take of
Sulphate of zinc, one drachm ;
Acetate of lead, four scruples ;
Distilled water, twenty ounces.
Dissolve each of the salts separately in ten ounces of water.
Mix the solutions; and after the impurities have subsided, filter the liquor.

### Tinctura acetatis zinci. *Dub.*
### *Tincture of Acetate of Zinc.*

Take of
Sulphate of zinc,
Acetate of kali, each one ounce.
Triturate them together, and add one pint of rectified spirit of wine.
Macerate for a week, with occasional agitation, and strain through paper.

This is a case of double elective attraction, the lead combining, and forming an insoluble compound with the sulphuric acid, while the zinc unites with the acetic acid, and remains in solution.

The acetate of zinc may be obtained by evaporation, in

talcy crystals. It is soluble in water, and is decomposed by heat. It is not poisonous.

When crystallized acetate of lead and sulphate of zinc are triturated together, the mixture presently becomes moist, which is owing to the new compounds retaining with less water of crystallization than the original salts, by which means a portion of the water is disengaged in its fluid form.

*Medical use.*—The solution of acetate of zinc is, with many practitioners, deservedly much esteemed as an astringent collyrium and injection. The solution in spirit of wine of the Dublin college is stronger and more stimulant than that in water of the Edinburgh.

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## Chap. XIV.

# ALCOHOL, ETHER, AND ETHEREAL SPIRITS.

### Alcohol. *Lond.*
*Alcohol.*

Take of
  Rectified spirit of wine, one gallon;
  Subcarbonate of potass, three pounds.

Put one pound of the subcarbonate, previously heated to 300° Fahr. into the spirit, and macerate for twenty-four hours, frequently stirring them; then decant the spirit, and add the remainder of the subcarbonate of potass heated to the same degree; and, lastly, distil off, in a water-bath, the alcohol, which is to be kept in a well-corked bottle.

The specific gravity of alcohol is to that of distilled water as 815 to 1000.

*Dub.*

Take of
  Rectified spirit of wine, one gallon;
  Pearl ashes, dried at 300° Fahr. and still warm, one pound;
  Caustic kali, in powder, one ounce;
  Muriate of lime, dried, half a pound.

Mix the spirit and kali; add the pearl-ashes, previously reduced to powder, and digest the mixture for three days, in

a close vessel, frequently agitating it; then pour off the spirit, mix with it the muriate of lime, and distil with a moderate heat, until the residuum begins to grow thick.

The specific gravity of this spirit is to that of distilled water as 815 to 1000.

The muriate of lime may be conveniently obtained from the residuum left in the preparation of water of caustic ammonia.

THE Edinburgh college give no directions for the preparation of a perfectly pure alcohol, as it is never used in pharmacy; but it is perhaps to be regretted, that they have given the title of alcohol to a liquid which is not the alcohol of chemists, although in their last edition they add epithets to characterize its state.

When any ardent spirit is re-distilled to procure alcohol, the water-bath is commonly used, which gives a more equal and temperate heat, and improves the product. Gren says, that the addition of four pounds of well-burnt charcoal and three or four ounces of sulphuric acid, previous to this rectification, destroys entirely the peculiar taste of malt spirit; and that a second rectification, with one pound of charcoal, and two ounces of sulphuric acid, affords an alcohol of very great purity. But the affinity of alcohol for water is so very strong, that it cannot be obtained entirely free from it by simple distillation. We must therefore abstract the water by means of some substance which has a stronger affinity for it than alcohol has. Carbonate of potass was formerly employed; but muriate of lime is preferable, because its affinity for water is not only very great, but by being soluble in alcohol, it comes in contact with every particle of the fluid. For this purpose, one part of muriate of lime, rendered perfectly dry by having been exposed to a red heat, and powdered after it becomes cold, is put into the still. Over this, three parts of highly rectified spirits are to be poured, and the mixture well agitated. By distillation with a very gentle heat, about two-thirds of the spirit will be obtained in the state of perfectly pure alcohol.

### ÆTHER SULPHURICUS. *Ed.*
### *Sulphuric Ether.*

Take of
  Sulphuric acid,
  Stronger alcohol, each thirty-two ounces.

Pour the alcohol into a glass retort, capable of sustaining a sudden heat, and add to it the acid, in an uninterrupted stream. Mix them by degrees, shaking them gently and frequently, and instantly distil from sand, previously

heated for the purpose, into a receiver kept cool with water or snow. The heat must also be so managed, that the liquor shall boil as soon as possible, and continue to boil till sixteen ounces are drawn off, when the retort is to be removed from the sand.

To the distilled liquor add two drachms of potass, and distil from a very high retort, with a very gentle heat, into a cool receiver, until ten ounces have been drawn off.

If sixteen ounces of stronger alcohol be poured upon the acid remaining in the retort after the first distillation, and the distillation be repeated, more Ether will be obtained; and this may be repeated several times.

*Dub.*

Take of

Sulphuric ethereal liquor, twenty ounces, by measure;
Subcarbonate of kali, dried and powdered, two drachms.

Mix them, and distil, with a very gentle heat, twelve ounces, by measure, from a very high retort into a cooled receiver.

Its specific gravity is 765, water being 1000.

*Lond.*

Take of

Rectified spirit,
Sulphuric acid, of each one pound and a half.

Put the spirit into a glass retort, and gradually add to it the acid, shaking them frequently, and taking care that the temperature, during the mixture, do not exceed 120° Fahr.

Then cautiously place the retort in a sand-bath, previously heated to 200°, so that the liquor may boil as quickly as possible, and the *ether* may be distilled over into a tubulated receiver, to which a vessel, cooled with snow or ice, is fitted. Continue the distillation until a heavier fluid begin to come over, which is seen in the bottom of the receiver, below the ether.

Pour twelve ounces more of rectified spirit upon the liquor remaining in the retort, and repeat the distillation of ether in the same manner.

Æther rectificatus. *Lond.*
*Rectified Ether.*

Take of

Sulphuric ether, fourteen fluidounces;
Fused potass, half an ounce;
Distilled water, two fluidounces.

Dissolve the potass first in the water, and add the ether to it, shaking them constantly until they are mixed. Lastly, with a heat of about 120°, distil from a large retort into a cold receiver, twelve fluidounces of rectified ether.

### ÆTHER SULPHURICUS CUM ALCOHOLE. *Ed.*
*Sulphuric Ether with Alcohol.*

Take of
Sulphuric ether, one part;
Stronger alcohol spirit, two parts.
Mix them.

### SPIRITUS ÆTHERIS SULPHURICI. *Lond.*
*Spirit of Sulphuric Ether.*

Take of
Sulphuric ether, half a pint;
Rectified spirit, a pint.
Mix them.

### LIQUOR ÆTHEREUS SULPHURICUS. *Dub.*
*Sulphuric Ethereal Liquor.*

Take of
Rectified spirit of wine,
Sulphuric acid, each thirty-two ounces, by weight.
Put the spirit heated to 120° into a glass retort capable of supporting a sudden heat, and pour upon it the acid, in a continued stream. Mix them gradually, and distil into a cooled receiver twenty ounces of liquor, by measure, with a sufficient and quick heat.
If sixteen ounces of rectified spirit of wine be poured upon the acid residuum in the retort, it will again afford, by distillation, sulphuric ethereal liquor.

### OLEUM ÆTHEREUM. *Lond.*
*Ethereal Oil.*

After the distillation of sulphuric ether, continue the distillation with a reduced heat, until a black froth swell up. Immediately remove the retort from the fire, and pour water upon the liquor which remains in the retort. Skim off the oily matter which swims upon the top of the water, and mix it with as much lime-water as will saturate the acid in it. Shake them together; and, lastly, collect the ethereal oil after it has separated.

SPIRITUS ÆTHERIS SULPHURICI COMPOSITUS. *Lond.*
*Compound Spirit of Sulphuric Ether.*

Take of
Spirit of sulphuric ether, one pint;
Ethereal oil, two fluidrachms.
Mix them.

LIQUOR ÆTHEREUS OLEOSUS. *Dub.*
*Oily Ethereal Liquor.*

Take what remains in the retort after the distillation of the vitriolic ether.
Distil to one half, with a moderate heat.

THE products rising from the decomposition of alcohol by the action of the acids are extremely curious and interesting. The theory of their formation was not understood until it was very ingeniously attempted by Fourcroy and Vauquelin, who are of opinion that the acid remains unchanged, and that the alcohol is converted into ether, water, and charcoal.

The most convenient way of mixing the ingredients, is to put the alcohol, previously heated, into a tubulated retort, and with a long-tubed funnel, reaching down to the bottom of the retort, to pour in the acid. By cautious agitation, the two fluids unite, and heat is produced, which may be taken advantage of in the distillation, if we have a sand-bath previously heated to the same degree, to set the retort into immediately after the mixture is completed; nor is there any occasion for a tubulated receiver, if we immerse the ordinary receiver, which ought to be large, in water, or bury it in broken ice.

The distillation is directed to be performed with an equal and very gentle, but quick heat; but Mr Phillips says erroneously, for when the distillation of 10 ounces of product was completed in three hours, its sp. gr. was 0.791; but when it occupied almost nine hours, its sp. gr. was only 0.782. The juncture of the retort and recipient is to be luted with a paste made of linseed meal, and further secured by a piece of wet bladder.

Immediately on mixing the acid with the alcohol, there is a considerable increase of temperature, and a slight disengagement of alcohol, somewhat altered, and having an aromatic odour. On placing the retort in the sand-bath, a portion of pure alcohol first comes over; and when the mixture in the retort boils, the ether rises, and is condensed in thin, broad, straight streaks, having the appearance of oil. Until the liquor which passes over into the receiver amounts to about

half, or somewhat more than half, of the alcohol operated on, it consists almost entirely of alcohol and ether, and there has been no disengagement of any permanently elastic fluid: but now the production of ether ceases, and sulphureous vapours begin to arise, which condense in irregular streaks, or in drops: we must therefore either put a stop to the process, or change the receiver. In the latter case, the products are sulphureous acid, acetic acid, water, and oil of wine, as it was called, accompanied towards the end by a peculiar species of carburetted hydrogen gas, called by the Dutch chemists Olefiant gas; because, when mixed with oxygenized muriatic acid, it forms oil. At last the matter in the retort, which has now become thick and black, swells up, and prevents us from carrying the process further.

If we stop the process before the sulphureous vapours arise, the whole acid, diluted with a proportion of water, and mixed with charcoal, remains in the retort; but if we allow the process to go on, there is a continual decomposition of the acid, which is therefore diminished in quantity. Mr Phillips has ascertained the sp. gr. of the products at different periods of the distillation. From 16 oz. of acid sp. gr. 1.837, and an equal weight of spirit sp. gr. 0.830, he got 12 ounces of product; 4 of ethereal spirit of sp. gr. 0.779; 4 more of sp. gr. 0.753; then $2\frac{1}{2}$ of yellow sulphureous spirit of sp. gr. 784; and lastly, $1\frac{1}{2}$ of heavy fluid of 0.981.

According to Proust, the sulphuric acid may be obtained from the black residuum in the retort, by diluting it with twice its weight of water, filtering it through linen, and evaporating it till it acquire the specific gravity 1.84, then adding about one five-hundredth part of nitrate of potass, and continuing the evaporation until the acid become perfectly colourless, and acquire the specific gravity of 1.86. The residuum, however, may be more advantageously preserved, as the colleges direct, for preparing more ether, by repeating the process with fresh quantities of alcohol. Proust indeed denies that this residuum is capable of converting more alcohol into ether; but that excellent chemist has somehow fallen into an error; for it is a fact, that was known in the time of that no less excellent chemist Dr Lewis, and inserted in the first edition of this Dispensatory, published in 1753, and not a recent discovery of Citizen Cadet, as Fourcroy would lead us to believe. If farther confirmation be wanted, we shall instance Göttling, who says, that from three or four pounds of this residuum he has prepared 60 or 70 pounds of the spirit of vitriolic ether, and more than twelve pounds of vitriolic

ether, without rectifying the residuum, or allowing the sulphureous vapour to evaporate.

Mr Phillips, from a pound each of acid and of spirit got seven ounces and a half of ether, specific gravity 0.768, and by a second distillation, after eight ounces more of spirit were added to the residuum, eight ounces, of 0.887. The mixture of these gave a specific gravity about 0.788, whereas the former of these products alone constituted the *spiritus ætheris vitriolici* of the late Pharmacopœia. By adding the spirit ordered to convert in into *spiritus ætheris vitriolici*, it acquires specific gravity 0.816, which is much weaker than the liquor of the same name in the former London Pharmacopœia.

The ether may be separated from the alcohol, water, and sulphureous acid, with which it is always mixed, by re-distilling it with a very gentle heat, after mixing it with potass, which combines with the acid, water, and alcohol. The alkali ought to be added in substance according to the directions of the Edinburgh college, not in solution as prescribed by that of London.

*Medical use.*—The chemical properties of ether have been already noticed. As a medicine taken internally, it is an excellent antispasmodic, cordial, and stimulant. In catarrhal and asthmatic complaints, its vapour is inhaled with advantage, by holding in the mouth a piece of sugar on which ether has been dropt. It is given as a cordial in nausea, and in febrile diseases of the typhoid type; as an antispasmodic in hysteria, and in other nervous and painful diseases; and as a stimulus in soporose and apoplectic affections. Regular practitioners most frequently give only a few drops for a dose; but empirics have sometimes ventured upon much larger quantities, and with incredible benefit. When applied externally, it is capable of producing two very opposite effects, according to its management; for, if it be prevented from evaporating, by covering the place to which it is applied, closely with the hand, it proves a powerful stimulant and rubefacient, and excites a sensation of burning heat. In this way it is frequently used for removing pains in the head or teeth. On the contrary, if it be dropt on any part of the body, exposed freely to the contact of the air, its rapid evaporation produces an intense degree of cold; and as this is attended with a proportional diminution of bulk in the part to which it is applied, in this way it has frequently facilitated the reduction of strangulated hernia.

The mixture of ether with alcohol, whether prepared directly by mixing them as the Edinburgh college direct, or in the impure state in which it comes over in the first part of

the process for distilling ether, possesses similar virtues with ether, but in an inferior degree.

Æther nitrosus. *Dub.*
*Nitrous Ether.*

Take of
Nitrate of kali, dried, and in coarse powder, one pound and a half;
Sulphuric acid, one pound;
Rectified spirit of wine, nineteen ounces, by measure.

Put the nitrate of kali into a tubulated retort, placed in a bath of cold water, and pour upon it gradually, and in different portions, the sulphuric acid and spirit, previously mixed, and allowed to cool after having been mixed. Without any external heat, or only a very slight degree of it (such as the addition of tepid water to the bath,) an ethereal liquor will begin to arise, without applying fire under it. In a short time, the heat will spontaneously increase in the retort, and a remarkable ebullition will take place, which are to be moderated, by cooling the bath with cold water. The receiver ought also to be cooled with water or snow, and furnished with a proper apparatus for transmitting the very elastic vapour (arising from the mixture, with very great force, if the heat should accidentally become too high) through a pound of rectified spirit of wine, placed in a cooled phial.

Put the ethereal liquor, which has distilled spontaneously, into a phial with a ground glass-stopper, and gradually add (closing the phial after each addition) as much very dry subcarbonate of kali in powder, as shall be sufficient to saturate the superabundant acid, according to the test of litmus. This commonly takes place on the addition of about a drachm of the salt; and in a short time, the nitrous ether will swim on the surface, and is to be separated by means of a funnel.

If it be required very pure, re-distil the ether from a water-bath, at about 140°, to one-half.

Its specific gravity is 900.

When alcohol and nitrous acid are mixed in the proportion necessary for the formation of nitrous ether, the utmost precautions must be taken to diminish their action on each other. Dr Black contrived a very ingenious method of doing this, by rendering their mixture extremely slow. On two ounces of strong nitrous acid, put into a phial, having a conical ground glass-stopper, and a weak spring fitted to keep the stopper in its place, pour slowly and gradually about

an equal quantity of water, which, by being made to trickle down the sides of the phial, will float on the surface of the acid, without mixing with it; then add, in the same cautious manner, three ounces of alcohol, which, in its turn, will float on the surface of the water. By this means the three fluids are kept separate, on account of their different specific gravities, and a stratum of water is interposed between the acid and spirit. The phial is now to be set in a cool place, and the acid will gradually ascend, and the spirit descend, through the water; this last acting as a boundary to restrain their action on each other. When this commences, bubbles of gas rise through the fluids, and the acid gets a blue colour, which it again loses in the course of a few days, and a yellow nitrous ether begins to swim on the surface. As soon as the formation of air-bubbles ceases, it is time to remove the ether formed; for if allowed to remain, its quantity decreases. By this method, nitrous ether is formed, without the danger of producing any explosion. The residuum of this process is still capable of forming a spirit of nitrous ether, with an additional quantity of alcohol.

By adding the acid to the alcohol in very small quantities, and at considerable intervals, Mr Dehne procured from two pounds of alcohol, and one pound ten ounces and three drachms of nitrous acid, one pound nine ounces and three drachms of ether; the residuum weighed one pound twelve ounces. There was therefore a loss of five ounces. Mr Dehne put the alcohol into a tubulated retort, to which a receiver was luted, and poured the acid through the tubulature, and the ether passed over into the receiver, without the application of any heat. The action of the acid on the alcohol did not begin until six ounces and a half were added, and was found to be exhausted, when, on adding more acid, it fell to the bottom in the form of green drops. By using Mr Dehne's precaution, of adding the acid gradually, I prepared nitrous ether in a Woulfe's apparatus, with perfect ease and safety, although Fourcroy represents it as a most dangerous operation. I introduced the acid gradually through a funnel luted into the tubulature of the retort. The tube of the funnel was very long, and its extremity was immersed in the alcohol in the retort. This simple contrivance not only enabled me to add to the acid as I pleased, but also acted as a tube of safety.

The method of forming nitrous ether, now directed by the Dublin college, is indeed said to be preferable to those mentioned. It was first practised by M. Voigt.

When alcohol is converted into ether by the action of ni-

trous acid, the change produced on it is nearly the same with that produced by sulphuric acid ; but, in the latter case, it is effected by the affinities which form water, and charcoal is precipitated ; and in the former, by the affinities which form carbonic acid, and no water is produced.

Nitrous ether seems to differ from sulphuric ether only in being combined with nitric oxide, at least it is highly inflammable, pungent, volatile, and is not soluble in water, while it gives a deep olive colour to green salts of iron, and has a considerable specific gravity. When simply washed with water, I found its sp. gr. to be 0.912 ; when the acid which it evidently contained was removed, by saturating it with potass, it became 0.896; and when rectified, by redistilling it, it became 0.866, but recovered decidedly acid properties, probably from the nitric oxide being acidified by the air of the apparatus.

### Spiritus ætheris nitrosi. *Ed.*
### *Spirit of Nitrous Ether.*

Take of
 Stronger alcohol, three pounds ;
 Nitrous acid, one pound.

Pour the alcohol into a capacious phial, placed in a vessel full of cold water, and add the acid by degrees, constantly agitating them. Let the phial be slightly covered, and placed for seven days in a cool place ; then distil the liquor, with the heat of boiling water, into a receiver kept cool with water or snow, till about three pounds come over.

### Spiritus æthereus nitrosus. *Dub.*
### *Nitrous Ethereal Spirit.*

Add to the matter which remains after the distillation of the nitrous ether, the rectified spirit of wine, which was employed in that operation for condensing the elastic vapours, and distil, with the greatest heat of a water-bath, to dryness. Mix the distilled liquor with the alkaline liquor which remained after the separation of the nitrous ether, and also add as much very dry subcarbonate of kali, as shall be sufficient to saturate the predominant acid, according to the test of litmus. Lastly, distil by the medium heat of a water-bath as long as drops come over.

The specific gravity of this liquor is 850.

SPIRITUS ÆTHERIS NITRICI. *Lond.*
*Spirit of Nitrous Ether.*

Take of
Rectified spirit of wine, two pints;
Nitric acid, three ounces, by weight.

Pour the acid gradually upon the spirit, and mix them, taking care that the heat do not exceed 120°, and distil with a gentle heat twenty-four fluidounces.

THE action of alcohol and nitrous acid upon each other is much influenced by their proportions. If we use a small proportion of alcohol, or pour alcohol into nitrous acid, there immediately takes place a great increase of temperature, and a violent effervescence and disengagement of red fumes. On the contrary, by placing the phials containing the alcohol and acid in cold, or rather iced water, they may be mixed, without danger, in the proportions directed by the colleges; and if the acid be added in small quantities at a time, and each portion thoroughly mixed with the alcohol by agitation, I find that no action takes place until heat be applied. It is therefore unnecessary to keep the mixture for seven days; but we may immediately proceed to the distillation, which must be performed with a very slow and well-regulated fire; for the vapour is very apt to expand with so much violence as to burst the vessels; and the heat must at no time exceed 212°, otherwise a portion of undecomposed acid will pass over, and spoil the product. By performing this operation carefully in a Woulfe's apparatus, I got in the receiver, from three ounces of alcohol, specific gravity 0.841, and one ounce of nitrous acid, two ounces four drachms of spirit of nitrous ether, specific gravity 0.887. Eight ounces of alcohol, contained in the first phial connected with the receiver, gained one drachm and a half, and acquired specific gravity 0.873, and eight ounces of water in the second, 18 grains: the residuum weighed seven drachms and a half. There was therefore a loss of 2 drachms 42 grains of permanently elastic fluids. The first portion of these that was examined seemed to be the air of the apparatus. In the next, the candle burnt with an enlarged and brightened flame: was it nitrous oxide? and all that passed afterwards was a mixture of carbonic acid and the etherized nitrous gas first described by the Dutch chemists. When recently prepared, this gas is inflammable, and does not form red fumes on coming into contact with atmospheric air: but when attempted to be kept over water, the water becomes acidulous, the gas is diminished in bulk about two-thirds, loses its inflammability,

and is now converted into red vapours on the admission of atmospheric air. It therefore appears to consist of nitric oxide gas, holding ether in chemical solution. I have formed a similar gas, by admitting a few drops of ether to nitrous oxide gas over mercury.

The Edinburgh college now directs the distillation to be continued till about three pounds come over.

When using the quantities ordered by the London college, only 24 fluidounces are drawn off, a perfectly colourless and very slightly acid product is obtained, of sp. gr. 0.834, but immediately afterwards the spirit becomes coloured and very acid. Hence the quantity, which was 26 ounces in London Phar. 1809, has been reduced.

The spirit of nitrous ether, thus obtained, is a colourless fluid, of a fragrant odour, lighter than water, extremely volatile and inflammable, possessing properties in general analogous to the spirit of sulphuric ether, but of considerably greater specific gravity, striking a deep olive, with a solution of green sulphate of iron, and often, if not always acid. By age and exposure to the air, it is gradually decomposed, and gives rise to the reproduction of nitrous acid When this change has taken place, it may be rectified, by saturating the acid with lime-water, and re-distilling the ethereal fluid.

In all probability, spirit of nitrous ether is a mixture of nitrous ether and alcohol; for, by diminishing the quantity of alcohol employed, we obtain a fluid having a similar relation to the spirit of nitrous ether that sulphuric ether has to the spirit of sulphuric ether. By adding alcohol to the residuum of nitrous ether, the Dublin college prepare their spirit of nitrous ether, in the same way as spirit of sulphuric ether is prepared from the residuum of sulphuric ether: and by mixing nitrous ether with alcohol, we obtain a fluid exactly resembling spirit of nitrous ether.

*Medical use.*—Spirit of nitrous ether has been long deservedly held in great esteem. It quenches thirst, promotes the natural secretions, expels flatulencies, and moderately strengthens the stomach. It may be given in doses of from twenty drops to a drachm, in any convenient vehicle. Mixed with a small quantity of spiritus ammoniæ aromaticus, it proves a mild, yet efficacious diaphoretic, and often remarkably diuretic, especially in some febrile cases, where such a salutary evacuation is wanted. A small proportion of this spirit added to malt spirits gives them a flavour approaching to that of French brandy.

## Chap. XV.

# VEGETABILIA. *Lond.*

*Vegetables.*

*Vegetables* are to be gathered in their native soil and situation, and in a dry season, when they are neither wet with showers nor dew; they are to be collected every year, and what are older must be thrown away.

*Roots*, for the most part, are to be dug up before they shoot up their leaves or stalks.

*Barks* ought to be gathered when they can be separated most easily from the wood.

*Leaves* are to be plucked after the flowers have faded, and before the seeds are ripe.

*Flowers* are to be gathered when just opened.

*Seeds* are to be collected when ripe, and before they fall, and are to be kept in their proper coverings.

### Vegetabilium præparatio. *Lond.*
*Preparation of Vegetables.*

*Vegetables*, soon after they are gathered, except those which are used fresh, are to be loosely spread out, and dried as quickly as possible, with a heat so low as not to alter the colour. They are then to be preserved from the action of light and moisture in proper situations or vessels.

*Roots*, which are directed to be preserved fresh, are to be buried in sand. The Squill, before drying it, is to have its arid coats peeled off, and to be cut transversely into thin slices.

### Vegetabilium exsiccatio. *Ed.*
*The Drying of Vegetable Substances.*

Herbs and flowers are to be dried by the gentle heat of a stove or common fire, in such quantities only at a time, that the process may be finished as quickly as possible: for by this means their powers are best preserved; the test of which is the perfect preservation of their natural colour.

The leaves of hemlock *(cònium maculatum,)* and of other plants containing a subtile volatile matter, must be reduced to powder immediately, after being dried, and afterwards kept in glass phials well corked.

The root of the sea-squill *(scilla maritima,)* after having removed its external coat, is to be previously cut transversely into thin slices. The sign of its being properly dried is, that although rendered friable, it retains its bitterness and acrimony.

### Herbarium exsiccatio. *Dub.*
*The Drying of Herbs.*

Put the fresh leaves of the herb, when in flower, into paper bags, and expose them to a low degree of heat for an hour; then spread them lightly upon a sieve, and dry them as quickly as possible, taking care that the green colour be not injured by too great a degree of heat: but if the herbs are to be used in the form of powder, they are to be powdered immediately, and preserved in small opaque phials well corked.

Herbs and flowers, from which waters or oils are to be distilled, should be dried as soon as they are gathered.

### Pulvis scillæ. *Dub.*
*Powder of Squills.*

Cut the squills, after having removed their membranaceous integuments, into transverse slices; dry these on a sieve with a gentle heat, and reduce them to powder, which is to be kept in phials with ground glass-stoppers.

By this method, the squill dries much sooner than when its several coats are only separated; the internal part being here laid bare, while, in each of the entire coats, it is covered with a thin skin, which impedes the exhalation of the moisture. The root loses in this process four-fifths of its original weight; the parts which exhale with a moderate heat appear to be merely watery: hence six grains of the dry root are equivalent to half a drachm of it when fresh;—a circumstance to be particularly regarded in the exhibition of this medicine. But if too great heat has been employed in drying it, it becomes almost inert, and it also loses its virtues by long keeping in the state of powder.

Dried squills furnish us with a medicine, sometimes advantageously employed as an emetic, often as an expectorant, and still more frequently as a powerful diuretic.

PULVIS SPONGIÆ USTÆ. *Dub.* SPONGIA USTA. *Lond.*
*Powder of Burnt Sponge.*

Cut the sponge in pieces, and bruise it, so as to free it from small stones (foreign matters adhering to it, *Lond.*); burn it in a covered iron vessel, until it become black and friable; afterwards reduce it to a very fine powder.

THIS medicine has been in use for a considerable time, and employed against bronchocele, scrofulous disorders, and cutaneous foulnesses, in doses of a scruple and upwards. Its virtues probably depend on the presence of a little alkali. It also contains charcoal, and its use may be entirely superseded by these substances, which may be obtained in other manners at a much cheaper rate.

PULVIS QUERCUS MARINÆ. *Dub.*
*Powder of Yellow Bladder Wrack.*

Take of

Yellow bladder wrack, in fruit, any quantity.

Dry and clean it; then expose it to the fire in an iron pot or crucible, covered with a perforated lid, until, after the vapours cease, the mass becomes of a dull red. Powder the carbonaceous mass which remains.

THIS charcoal was formerly known under the name of *Æthiops Vegetabilis*. It is analogous to the preceding article.

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## CHAP. XVI.

# EXPRESSED AND INSPISSATED JUICES.

THE juices of succulent plants are obtained by expression. They are of a very compound nature, consisting of the sap, the secreted fluids, and fecula, mixed together. When first prepared, they are very high coloured, turbid, and loaded with parenchymatous matter. They may be purified by rest, filtration, heat, and clarification. Rest may be employed with juices, which are very fluid, do not contain volatile matter, and are not susceptible of alteration, and with subacid juices, as that of lemon. By rest these undergo a kind of slight fermentation, and all their mucilaginous, and other viscid parts,

separate. Filtration is perhaps the most perfect means of defecation, but it is tedious, and applicable only to very fluid juices. In many instances it may be facilitated by the addition of water. The action of heat is more expeditious, and is employed for juices which are very alterable, or which contain volatile matter. It is performed by introducing the juice into a matrass, and immersing it in boiling water for some minutes. The fecula are coagulated, and easily separated by filtration. Clarification by white of egg can only be used for very viscid mucilaginous juices, which contain nothing volatile. The white of two eggs may be allowed to each pint of juice. They are beat to a fine froth, the juice gradually mixed with them, and the whole brought to ebullition. The albumen coagulating envelops all the parenchymatous and feculent matters, and the juice now passes the filter readily. By this process, juices are rendered sufficiently fine; but the heat employed deepens their colour, and manifestly alters them, so that it is not merely a defecating but a decomposing process. When depurated, juices are yellow or red, but never green.

The fluids thus extracted from succulent fruits, whether acid or sweet, from most of the acrid herbs, as scurvy-grass and water cresses, from the acid herbs, as sorrel and wood-sorrel, from the aperient lactescent plants, as dandelion and hawkweed, and from various other vegetables, contain great part of the peculiar taste and virtues of the respective subjects. The juices, on the other hand, extracted from most of the aromatic herbs, have scarcely any thing of the flavour of the plants, and seem to differ little from decoctions of them made in water boiled till the volatile odorous parts have been dissipated. Many of the odoriferous flowers, as the lily, violet, and hyacinth, not only impart nothing of their fragrance to their juice, but have it totally destroyed by the previous bruising. From want of sufficient attention to these particulars, practitioners have been frequently deceived in the effects of preparations of this class: juice of mint has been often prescribed as a stomachic, though it wants those qualities by which mint itself and its other preparations operate.

There are differences as great in regard to their preserving those virtues, and this independently of the volatility of the active matter, or its disposition to exhale. Even the volatile virtue of scurvy-grass may, by the above method, be preserved almost entire in its juice for a considerable time; while the active parts of the juice of the wild cucumber quickly se-

parate and settle to the bottom, leaving the fluid part inert. Juices of arum root, iris root, bryony root, and other vegetables, in like manner, allow their medicinal parts to settle at the bottom.

If juices are intended to be kept for any length of time, about one-fortieth part of their weight of good spirit of wine may be added, and the whole suffered to stand as before: a fresh sediment will now be deposited, from which the liquor is to be poured off, strained again, and put into small bottles which have been washed with spirit and dried. A little oil is to be poured on the surface, so as very nearly to fill the bottles, and the mouths closed with leather, paper, or stopped with straw, as the flasks are in which Florence oil is brought to us: this serves to keep out dust, and suffers the air to escape, which, in process of time, arises from all vegetable liquors, and which would otherwise endanger the bursting of the glasses; or being imbibed afresh, render their contents vapid and foul. The bottles are to be kept on the bottom of a good cellar or vault, placed up to the necks in sand. By this method some juices may be preserved for a year or two; and others for a much longer time, though whatever care be taken, they are found to answer better when fresh; and from the difficulty of preserving them, they have of late been very much laid aside, especially since we have been provided with more convenient and useful remedies. The expressed juice is no longer a form in any of our Pharmacopœias, as it does not retain its virtues, but may be ordered extemporaneously. They may be taken in doses from an ounce or two to a quarter of a pint, two or three times a-day: they generally increase the urinary secretion, and sometimes induce a laxative habit.

The Inspissated Juice is a very convenient form for the exhibition of those substances which are sufficiently succulent to afford a juice by expression, and whose virtues do not reside in any very volatile matter. By inspissation, the bulk of the requisite dose is very much diminished; they are reduced to a form convenient for making up into pills; and they are much less apt to spoil than the simple expressed juices. The mode of their preparation is not yet, however, reduced to fixed principles. Some direct the juices to be inspissated as soon as they are expressed; others allow them previously to undergo a slight degree of fermentation; some defecate them before they proceed to inspissate them; and, lastly, Baumé prepares his elaterium by inspissating the defecated juice of the wild

cucumber, while our colleges give the same name to the matter which subsides from it. The nature of the soil, of the season, and many other circumstances, must materially alter the quantity or nature of the product. In moist years, Baumé got from thirty pounds of alder berries, four or five pounds of inspissated juice, and in dry years only two; or two and a half. From hemlock he got, in October 1769, 7.5 *per cent.* of inspissated juice, and in May of the same year only 3.7; on the contrary, in August 1768, 4 *per cent.*, and in May 1770, 6.5; but, in general, the product in the autumn months was greatest.

SUCCI SPISSATI. *Ed.*
*Inspissated Juices.*

Bruise the fresh substance, and, including it in a hempen bag, compress it strongly till it yield its juice, which is to be evaporated in shallow vessels heated in boiling water, saturated with muriate of soda, and immediately reduced to the consistence of thick honey.

After the mass has become cold, it is to be put up in glazed earthen vessels, and moistened with alcohol.

In the same manner are prepared,

SUCCUS SPISSATUS ACONITI NAPELLI. *Ed.*
*Inspissated Juice of Wolfsbane*, from the leaves.

SUCCUS SPISSATUS ATROPÆ BELLADONÆ. *Ed.*
*Inspissated Juice of Deadly Nightshade*, from the leaves.

SUCCUS SPISSATUS CONII MACULATI. *Ed.*
*Inspissated Juice of Hemlock*, from the leaves.

SUCCUS SPISSATUS HYOSCIAMI NIGRI. *Ed.*
*Inspissated Juice of Henbane*, from the plant.

SUCCUS SPISSATUS LACTUCÆ SATIVÆ. *Ed.*
*Inspissated Juice of Garden Lettuce*, from the plant.

SUCCUS SPISSATUS LACTUCÆ VIROSÆ. *Ed.*
*Inspissated Juice of Poisonous Lettuce*, from the plant.

SUCCUS SPISSATUS CICUTÆ. *Dub.*
*Inspissated Juice of Hemlock.*

Express the leaves of hemlock, gathered when the flowers are just appearing, and allow the juice to stand six hours, until the fæces subside; then reduce the decanted juice to the thickness of an extract, with a moderate heat.

EXTRACTUM ACONITI. *Lond.*
*Extract of Monkshood.*

Take of
Monkshood leaves, fresh, one pound.
Bruise them in a stone mortar, sprinkling a little water upon them: then express the juice, and evaporate it without separating the sediment, to a proper thickness.

IN the same manner are prepared,

EXTRACTUM BELLADONÆ. *Lond.*
*Extract of Deadly Nightshade.*

EXTRACTUM CONII. *Lond.*
*Extract of Hemlock.*

EXTRACTUM HYOSCIAMI. *Lond.*
*Extract of Henbane.*

THESE are not properly extracts, but inspissated juices. It is, however, necessary to observe, that the mode of prepation directed by the London and Edinburgh colleges differs from that of Dublin, in not separating the feculent matter which always is deposited from expressed juices. What the effect of this feculum is upon the virtues, consistency, or durability, of the inspissated juices, is not well ascertained.

SUCCUS SPISSATUS SAMBUCI NIGRI. *Ed.*
*Inspissated Juice of Elder Berries.*

Take of
Juice of ripe elder berries, five parts;
Refined sugar, one part.
Evaporate with a gentle heat, to the consistence of pretty thick honey.

SUCH inspissated juices contain the virtues of the respective vegetables in a very concentrated state. Those of the elder, black currant, and lemon, are acidulous, cooling, and laxative, and may be used in considerable quantities, while those of the wolfsbane, hemlock, deadly nightshade, henbane, and poisonous lettuce, are highly narcotic and deleterious, and must be given only in very small doses.

ELATERIUM. *Dub.*
*Elaterium.*

Slice ripe wild cucumbers, express the juice very gently, and strain it through a very fine hair-sieve, into a glass vessel.

Then set it aside for some hours until the thicker part subside. Reject the supernatant liquor, and dry with a moderate heat the feculum, laid upon and covered with a linen cloth.

EXTRACTUM ELATERII. *Lond.*
*Extract of Elaterium.*

Slice ripe wild cucumbers, express the juice very gently, and filter it through a very fine hair-sieve, into a glass vessel; then let it rest for some hours, until the thicker part subside. Throw away the thinner supernatant fluid, and dry the thicker part with a gentle heat.

THIS is not properly an inspissated juice, but a deposition from the expressed juice. Such depositions have long been called Fecula, and the denomination has been confirmed in modern times. Its application, however, appears to be too extended; for feculum is applied both to mild and nutritious substances, such as starch, and to drastic substances, such as that of which we are now treating.

Common filtration through paper does not succeed here: the grosser parts of the juice, falling to the bottom, form a viscid cake upon the paper, which the liquid cannot pass through. The separation is to be effected by draining the fluid from the top, by placing one end of some moistened stripes of woollen cloth, skeins of cotton, or the like, in the juice, and laying the other end over the edge of the vessel, so as to hang down lower than the surface of the liquor.

*Medical use.*—Elaterium is a very violent hydragogue cathartic. In general, previous to its operation, it excites considerable sickness at stomach, and frequently produces severe vomiting. It is therefore seldom employed till other remedies have been tried in vain. But in some instances of ascites, it will produce a complete evacuation of water, where other cathartics have had no effect. Two or three grains are, in general, a sufficient dose, although perhaps the best mode of exhibiting it is by giving it only to the extent of half a grain at a time, and repeating that dose every hour, till it begins to operate.

## PULPS.

PULPARUM EXTRACTIO. *Ed.*
*Extraction of Pulps.*

Boil unripe pulpy fruits, and ripe ones, if they be dry, in a small quantity of water, until they become soft; then press

out the pulp through a hair-sieve, and afterwards boil it down to the consistence of honey, in an earthen vessel, over a gentle fire, taking care to stir the matter continually, to keep it from burning.

The pulp of *Cassia fistularis* is, in like manner, to be boiled out from the bruised pod, and reduced afterwards to a proper consistence, by evaporating the water.

The pulps of fruits that are both ripe and fresh are to be expressed through the sieve, without any previous boiling.

*Dub.*

Fruits, whose pulps are to be extracted, if they be unripe, or ripe and dry, are to be boiled in a little water until they become soft. Then the pulps, expressed through a hair-sieve, are to be evaporated to a proper degree of thickness.

*Lond.*

Set *pulpy fruits*, if they be unripe, or ripe and dry, in a moist place, that they may become soft; then press the pulps through a hair-sieve: afterwards boil them with a gentle heat, and stir them frequently; and, lastly, evaporate the water in a water-bath, until the pulps acquire the proper consistency.

Pour boiling water on the bruised pods of the *Cassia*, so as to wash out the pulp; which is then to be pressed, first through a coarse sieve, and afterwards through a hair-sieve; lastly, evaporate the water in a water-bath, so as to reduce the pulp to a proper consistency.

Express the pulps of ripe and recent fruits through a sieve, without boiling them.

When these fruits are not sufficiently juicy to afford a pulp by simple expression, the decoction ordered by the Edinburgh and Dublin college is much more certain, and in every respect preferable to exposing them to a moist air, which is not only often inefficacious, but is apt to render them spoilt and mouldy. On the other hand, the precaution used by the London college, of finishing the evaporation in a water-bath, is highly proper, as otherwise they are extremely apt to become empyreumatic.

The pulps expressed from recent substances, without coction, are less mucilaginous, are more apt to allow their fluid parts to separate, when left at rest, than when they have been previously boiled. Very succulent vegetables, such as apples, pears, and lily roots, may be roasted in hot ashes, instead of being boiled.

## Chap. XVII.—FIXED OILS.

These oils are commonly denominated Expressed Oils, an appellation which is manifestly improper, as, in some instances, they are obtained without expression, and, in others, expression is employed to obtain volatile oils. The Edinburgh college have therefore distinguished these different classes of oils by the terms Fixed and Volatile, which accurately characterise them.

Fixed oil is formed in no other part of vegetables than in their fruit. Sometimes, although very rarely, it is contained in the parenchyma of the fruit. Of this the best known example is the olive. But it is most commonly found in the seeds of dicotyledonous vegetables, sometimes also in the fruit of monocotyledonous plants, as the cocos butyracea. It has various degrees of consistency, from the tallow of the croton sebiferum of China, and the butter of the butter-tree of Africa, to the fluidity of olive oil.

Fixed oils are either

1. Fat, easily congealed, and not inflammable by nitric acid, such as oil of olives, almonds, rapeseed, and ben.
2. Drying, not congealable, inflammable by nitric acid, such as oil of linseed, nut, and poppy.
3. Concrete, such as palm oil, &c.

Fixed oil is separated from the fruits and seeds which contain it, either by expression or decoction. Heat, by rendering the oil more limpid, increases very much the quantity obtained by expression; but as it renders it less bland, and more apt to become rancid, heat is not used in the preparation of oils which are to be employed in medicine. When obtained by expression, oils often contain a mixture of mucilage, starch, and colouring matter; but part of these separate in course of time, and fall to the bottom. When oils become rancid, they are no longer fit for internal use, but are then said to effect the killing of quicksilver, as it is called, more quickly. Decoction is principally used for the extraction of the viscid and consistent oils, which are melted out by the heat of the boiling water, and rise to its surface.

Those who prepare large quantities of the oil of almonds

blanch them, by steeping them in very hot water, which causes their epidermis to swell and separate easily. After peeling them they dry them in a stove, then grind them in a mill like a coffee-mill, and, lastly, express the oil from the paste, inclosed in a hempen bag. By blanching the almonds, the paste which remains within the bag is sold with greater advantage to the perfumers, and the oil obtained is perfectly colourless. But the heat employed disposes the oil to become rancid, and the slight colour the oil acquires from the epidermis does not injure its qualities. For pharmaceutical use, therefore, the almonds should not be blanched, but merely rubbed in a piece of coarse linen, to separate as much as possible the brown powder adhering to the epidermis. Sixteen ounces of sweet almonds commonly give five ounces and a half of oil. Bitter almonds afford the same proportion, but the oil has a pleasant bitter taste.

OLEUM AMYGDALÆ COMMUNIS. *Ed.*
*Oil of Almonds.*

After having bruised fresh almonds in a stone mortar, put them into a hempen bag, and express the oil, without heat.

In the same manner express from the seeds,

OLEUM LINI USITATISSIMI. *Ed.*
*Oil of Linseed.*

OLEUM AMYGDALARUM. *Dub.*
*Oil of Almonds.*

Bruise fresh almonds in a mortar, and express the oil in a press, without heat.

OLEUM LINI. *Dub.*
*Oil of Linseed,*

Is expressed in the same way from the seeds.

OLEUM AMYGDALARUM. *Lond.*
*Oil of Almonds.*

Macerate almonds, either sweet or bitter, in cold water, for twelve hours, and bruise them. Then express the oil, without heat.

OLEUM LINI. *Lond.*
*Oil of Linseed.*

Bruise the seeds of common flax, and express the oil, without heat.

OLEUM RICINI. *Lond.*
*Castor Oil.*

Bruise the peeled seeds, and express the oil without heat.

THE chemical properties of these oils have been already mentioned; and an account of the medical virtues of each will be found in their respective places in the Materia Medica.

## CHAP. XVIII.—OILY PREPARATIONS.

OLEUM AMMONIATUM. *Ed.*
*Ammoniated Oil.*

Take of
  Olive oil, eight parts;
  Water of ammonia, one part.
Mix them together.

LINIMENTUM AMMONIÆ. *Dub.*
*Liniment of Ammonia.*

Take of
  Water of caustic ammonia, two drachms by measure;
  Olive oil, two ounces by measure.
Mix them.

LINIMENTUM AMMONIÆ FORTIUS. *Lond.*
*Stronger Liniment of Ammonia.*

Take of
  Water of ammonia, one fluidounce;
  Olive oil, two fluidounces.
Shake them together until they mix.

LINIMENTUM AMMONIÆ SUBCARBONATIS. *Lond.*
*Liniment of Subcarbonate of Ammonia.*

Take of
  Solution of subcarbonate of ammonia, one fluidounce;
  Olive oil, three fluidounces.
Shake them together till they are mixed.

The most commonly adopted generic name for the combination of oil with alkalies is soap, and the species are distinguished by the addition of the name of the alkali they contain. On these principles, volatile liniment should be called Soap of Ammonia, as hard soap is soap of soda, and soft soap soap of potass.

The ammonia used in the three first of these preparations, combines much more easily and intimately with the oil than the carbonate of ammonia used in the last. If the carbonate be employed with the view of rendering the preparation less stimulating, the same end will be more scientifically obtained, by increasing the proportion of oil mixed with pure ammonia. The third of these liniments differs greatly in point of strength from the two first.

*Medical use.*—They are frequently used externally as stimulants and rubefacients. In inflammatory sore throats, a piece of flannel moistened with these soaps, applied to the throat, and renewed every four or five hours, is one of the most efficacious remedies. By means of this warm stimulating application, the neck, and sometimes the whole body, is put into a sweat, which, after bleeding, either carries off or lessens the inflammation. When too strong, or too liberally applied, they sometimes occasion inflammation, and even excite blisters. Where the skin cannot bear their acrimony, a larger proportion of oil may be used.

But the first of these preparations is even sometimes used internally, made into a mixture with syrup and some aromatic water. A drachm or two taken in this manner, three or four times a-day, is a powerful remedy in some kinds of catarrh and sore throat.

### Oleum lini cum calce, sive Linimentum aquæ calcis. *Ed.*

*Liniment of Lime Water*, or *Linseed Oil with Lime.*

Take of
  Linseed oil,
  Lime-water, of each equal parts.
Mix them.

### Linimentum calcis. *Dub.*

*Lime Liniment.*

Take of
  Lime-water,
  Olive oil, of each three ounces by measure.
Shake them together till they mix.

This liniment, commonly called Carron Oil, is extremely useful in cases of scalds or burns, being singularly efficacious in preventing, if applied in time, the inflammation subsequent to these; or even in removing it, after it has come on.

It is also a species of soap, and might be called Soap of Lime, although it probably contains a great excess of oil.

### Oleum camphoratum. *Ed.*
*Camphorated Oil.*

Take of
  Olive oil, eight parts;
  Camphor, one part.
Triturate them together till the camphor be dissolved.

*Dub.*

Take of
  Olive oil, two ounces, by measure;
  Camphor, half an ounce.
Triturate them together.

This is a simple solution of camphor in fixed oil, and is an excellent application to local pains, from whatever cause, and to glandular swellings.

### Oleum sulphuratum. *Ed.*
*Sulphuretted Oil.*

Take of
  Olive oil, eight parts;
  Sublimed sulphur, one part.
Boil them together with a gentle fire in a large iron pot, stirring them continually till they unite.

*Lond.*

Take of
  Washed sulphur, two ounces;
  Olive oil, a pint.
Gradually project the sulphur upon the oil, heated in a very large iron vessel, and stir constantly with a spatula, till they unite.

Göttling directs the oil to be heated in an iron pot, and the sulphur to be gradually added, while the solution is promoted by constant stirring with an iron spatula. The pot must be sufficiently large, as the mixture swells and boils up very much; and as it is apt to catch fire, a lid should be at hand to extinguish it by covering up the pot.

*Medical use.*—Sulphuretted oil was formerly strongly re-

commended in coughs, consumptions, and other disorders of the breast and lungs: but the reputation which it had in these cases does not appear to have been derived from any fair trial or experience. It is manifestly hot, acrimonious, and irritating, and should therefore be used with the utmost caution. It has frequently been found to injure the appetite, offend the stomach and viscera, parch the body, and occasion thirst and febrile heats. The dose of it is from ten to forty drops. It is employed externally for cleansing and healing foul running ulcers: and Boerhaave conjectures, that from its effects in these cases, the virtues ascribed to it, when taken internally, were deduced by a false analogy.

## Chap. XIX.—VOLATILE OILS.

Substances which differ in volatility may be separated from each other by applying a degree of heat capable of converting the most volatile into vapour, and by again condensing this vapour in a proper apparatus. Water is converted into vapour at 212°, and may be separated by distillation from the earthy and saline matters which it always contains in a natural state. But it is evident, that if any substances which are as volatile as water be exposed to the same degree of heat, either by immersing them in boiling water, or exposing them to the action of its steam, they will rise with it in distillation. In this way the camphor and volatile oils of vegetable substances are separated from the more fixed principles.

Volatile oils are obtained only from odoriferous substances; but not equally from all of this class, nor in quantity proportional to their degree of odour. Some which, if we were to reason from analogy, should seem very well fitted for this process, yield extremely little oil, and others none at all. Roses and chamomile flowers, whose strong and lasting smell promises abundance, are found to contain but a small quantity of oil; the violet and jessamine flower, which perfume the air with their odour, lose their smell upon the gentlest coction, and do not afford any oil on being distilled, unless immense quantities are submitted to the operation at once: while savin, whose disagreeable scent extends to no great distance, gives

out the largest proportion of volatile oil of almost any vegetable known.

Nor is the same plant equally fit for this operation, when produced in different soils or seasons, or at different times of their growth. Some yield more oil if gathered when the flowers begin to fall off than at any other time. Of this we have examples in lavender and rue; others, as sage, afford the largest quantity when young, before they have sent forth any flowers; and others, as thyme, when the flowers have just appeared. All fragrant herbs yield a larger proportion of oil, when produced in dry soils, and in warm summers, than in opposite circumstances. On the other hand, some of the disagreeable strong-scented plants, as wormwood, are said to contain most oil in rainy seasons, and when growing in moist rich grounds.

Several chemists have been of opinion, that herbs and flowers, moderately dried, yield a greater quantity of volatile oil, than if they were distilled when fresh. It is, however, highly improbable, that the quantity of volatile oil will be increased by drying; on the contrary, part of it must be dissipated and lost. But drying may sometimes be useful in other ways, either by diminishing the bulk of the subject to be distilled, or by causing it to part with its oil more easily; and aromatic waters, distilled from the dry herb, are more fragrant than from the fresh. But the directions of the London college to dry the herb used in the distillation of volatile oils would be extremely inconvenient, and large quantities of the oils of lavender, peppermint, spearmint, and pennyroyal, are annually distilled in this country from the fresh herb. The oils of aniseed, chamomile, caraway, juniper, origanum, rosemary and pimento, are usually imported.

The choice of proper instruments is of great consequence for the performance of this process to advantage. There are some oils which pass freely over the swan neck of the head of the common still: others, less volatile, cannot easily be made to rise so high. For obtaining these last, we would recommend a large low head, having a rim or hollow canal round it: in this canal, the oil is detained in its first ascent, and thence conveyed at once into the receiver, the advantages of which are sufficiently obvious.

We cannot separate the volatile oil from aromatic substances by distilling them alone, because the proportion of these oils is so small, that they could not be collected; and besides, it would be impossible to regulate the heat so as to be sufficient, and yet not to burn the subject, and destroy the product. Hence it is necessary to distil them with a proportion

of water, which answers extremely well, as the oils are all more volatile in water, and soluble in it only to a certain extent.

With regard to the proportion of water to be employed; if whole plants, moderately dried, are used, or the shavings of woods, as much of either may be put into the vessel as, lightly pressed, will occupy half its cavity; and as much water may be added as will fill two-thirds of it. When fresh and juicy herbs are to be distilled, thrice their weight of water will be fully sufficient; but dry ones require a much larger quantity. In general, there should be so much water, that after all intended to be distilled has come over, there may be liquor enough left to prevent the matter from burning to the still. The water and ingredients, altogether, should never take up more than three-fourths of the still; there should be liquor enough to prevent any danger of empyreuma, but not so much as to be in danger of boiling over into the receiver.

The subject of distillation should be macerated in the water until it be perfectly penetrated by it. To promote this effect, woods should be thinly shaved across the grain, or sawn, roots cut transversely into thin slices, barks reduced into coarse powder, and seeds slightly bruised. Very compact and tenacious substances require the maceration to be continued a week or two, or longer; for those of a softer and looser texture, two or three days are sufficient, while some tender herbs and flowers not only stand in no need of maceration, but are even injured by it. The fermentation which was formerly prescribed in some instances is always hurtful.

The fire ought to be quickly raised, and kept up during the whole process; but to such a degree only, that the oil may freely distil; otherwise the oil will be exposed to an unnecessary heat; a circumstance which ought, as much as possible, to be avoided. Fire communicates to all these oils a disagreeable impregnation, as is evident from their being much less grateful when newly distilled, than after they have stood for some time in a cool place; and the longer the heat is continued, the greater alteration it produces in them.

The greater number of oils require for their distillation the heat of water strongly boiling; but there are many also which rise with a heat considerably less; such as those of lemon and citron peel, of the flowers of lavender and rosemary, and of almost all the more odoriferous kinds of flowers. We have already observed, that these flowers have their fragrance much injured, or even destroyed, by beating and bruising them; it is impaired also by the immersion in water in the present process, and the more so in proportion to the continuance of the

immersion and the heat; hence oils, distilled in the common manner, prove much less agreeable in smell than the subjects themselves. For the distillation of substances of this class, another method has been contrived: instead of being immersed in water, they are exposed only to its vapour. A proper quantity of water being put into the bottom of the still, the odoriferous herbs or flowers are laid lightly in a basket, of such a size that it may enter into the still, and rest against its sides, just above the water. The head being then fitted on, and the water made to boil, the steam, percolating through the subject, imbibes the oil, without impairing its fragrance, and carries it over into the receiver. Oils thus obtained possess the odour of the subject in an exquisite degree, and have nothing of the disagreeable scent perceivable in those distilled by boiling them in water in the common manner.

Plants differ so much, according to the soil and season of which they are the produce, and likewise according to their own ages, that it is impossible to fix the quantity of water to be drawn from a certain weight of them to any invariable standard. The distillation may always be continued as long as the liquor runs well flavoured off the subject, but no longer.

The mixture of water and oil which comes over may either be separated immediately, by means of a separatory, or after it has been put into large narrow-necked bottles, and placed in a cool place, that the portion of oil which is not dissolved in the water may rise to the top, or sink to the bottom, according to its specific gravity. It is then to be separated, either by a separatory, or by means of a small glass syringe; or by means of a filter of paper; or, lastly, by means of a woollen thread, one end of which is immersed in the oil, and the other lower end in a phial: the oil will thus pass over into the phial by capillary attraction, and the thread is to be squeezed dry.

The water employed in the distillation of volatile oils always imbibes some portion of the oil, as is evident from the smell, taste, and colour which it acquires. It cannot, however, retain above a certain quantity; and hence, such as has been already used, and therefore almost saturated, may be advantageously employed, instead of common water, in a second, or any future distillation of the same subject.

After the distillation of one oil, particular care should be had to clean the worm perfectly before it be employed in the distillation of a different substance. Some oils, those of wormwood and aniseeds for instance, adhere to it so tenaciously, as not to be melted out by heat, or washed off by wa-

ter; the best way of removing these is to run a little spirit of wine through it.

Volatile oils, after they are distilled, should be suffered to stand for some days, in vessels loosely covered with paper, till they have lost their disagreeable fiery odour, and become limpid: then put them up in small bottles, which are to be kept quite full, and closely stopped, in a cool place. With these precautions, they will retain their virtues in perfection for many years.

Most of the oils mentioned are prepared by our chemists in Britain, and are easily procurable in a tolerable degree of perfection; but the oils from the more expensive spices, though still introduced among the preparations in the foreign Pharmacopœias, are, when employed among us, usually imported from abroad.

These are frequently so much adulterated, that it is not easy to meet with such as are at all fit for use: nor are these adulterations easily discoverable. The grosser abuses, indeed, may be readily detected. Thus, if the oil be mixed with alcohol, it will turn milky on the addition of water; if with expressed oils, alcohol will dissolve the volatile, and leave the other behind; if with oil of turpentine, on dipping a piece of paper in the mixture, and drying it with a gentle heat, the turpentine will be betrayed by its smell. But the more subtile artists have contrived other methods of sophistication, which elude all trials of this kind.

Some have looked upon the specific gravity of oils as a certain criterion of their genuineness. This, however, is not to be absolutely depended on; for the genuine oils, obtained from the same subjects, often differ in gravity as much as those drawn from different ones. Cinnamon and cloves, whose oils usually sink in water, yield, if slowly and carefully distilled, oils of great fragrancy, which are specifically lighter than the aqueous fluid employed in their distillation; whilst, on the other hand, the last runnings of some of the lighter oils prove sometimes so ponderous as to sink in water.

As all volatile oils agree in the general properties of solubility in spirit of wine, sparing solubility in water, miscibility with water, by the intervention of certain intermedia, volatility in the heat of boiling water, &c. it is plain that they may be variously mixed with each other, or the dearer sophisticated with the cheaper, without any possibility of discovering the abuse by any trials of this kind: and, indeed, it would not be of much advantage to the purchaser, if he had infallible criteria of the genuineness of every individual oil. It is of as much importance that they be *good*, as that they be *genuine*;

for genuine oils, from inattentive distillation, and long and careless keeping, are often weaker, both in smell and taste, than the common sophisticated ones.

The smell and taste seem to be the only certain tests of which the nature of the thing will admit. If a bark should have in every respect the appearance of good cinnamon, and should be proved indisputably to be the genuine bark of the cinnamon tree, yet if it want the cinnamon flavour, or has it but in a low degree, we reject it; and the case is the same with the oil. It is only from use and habit, or comparison with specimens of known quality, that we can judge of the goodness, either of the drugs themselves, or of their oils.

Most of the volatile oils, indeed, are too hot and pungent to be tasted with safety: and the smell of the subject is so much concentrated in them, that a small variation in this respect is not easily distinguished; but we can readily dilute them to any assignable degree. A drop of the oil may be dissolved in spirit of wine, or received on a bit of sugar, and dissolved by that intermedium in water. The quantity of liquor which it thus impregnates with its flavour, or the degree and quality of flavour which it communicates to a certain determinate quantity of liquor, will be the measure of the degree of goodness of the oil.

### Olea volatilia. *Ed.*
### *Volatile Oils.*

Only so much water is to be added to the substance, as will be sufficient to prevent it from being burnt when distilled. The distillation is to be performed after due maceration, and the oil is, lastly, to be separated from the water.

Besides, in preparing these distilled waters and oils, it is to be observed, that the goodness of the subject, its texture, the season of the year, and similar causes, must give rise to so many differences, that no certain or general rule can be given to suit accurately each example. Therefore many things are omitted, to be varied by the operator according to his judgment, and only the most general precepts are given.

### Olea distillata. *Lond.*
### *Distilled Oils.*

The seeds of anise and caraway, the flowers of chamomile and lavender, the berries of juniper and allspice, the tops of rosemary, and the dried herbs of other articles, are to be used.

Each of these is to be put into an alembic, and covered with water, and the oil drawn off by distillation into a large refrigeratory.

The water which comes over with the oils of caraway, peppermint, mint, allspice, and pennyroyal, in distillation, is to be kept for use.

*Dub.*

Let the oil be extracted, by distillation, from the subject previously macerated in water, with the addition of as much water as may be sufficient to prevent empyreuma.

In distilling fennel, peppermint, spearmint, pennyroyal, and pimento, the liquor which comes over along with the oil is to be preserved for use in the manner directed in the chapter on Distilled Waters.

According to these directions, prepare

| | |
|---|---|
| OLEUM VOLATILE. *Ed.*<br>OLEUM DISTILLATUM. *Lond. Dub.* | Volatile, or distilled oil of |
| ANTHEMIDIS NOBILIS. *Ed.*<br>ANTHEMIDIS. *Lond.* | Chamomile, *from the flowers.* |
| CARUI. *Dub. Lond.* | Caraway, *from the seeds.* |
| FŒNICULI DULCIS. *Dub.* | Fennel, *from the seeds.* |
| JUNIPERI COMMUNIS. *Ed.*<br>JUNIPERI. *Lond. Dub.* | Juniper, *from the berries.* |
| JUNIPERI SABINÆ. *Ed.*<br>SABINÆ. *Dub.* | Savine, *from the leaves.* |
| LAURI SASSAFRAS. *Ed.*<br>SASSAFRAS. *Dub.* | Sassafras, *from the root, bark, and wood.* |
| LAVANDULÆ SPICÆ. *Ed.*<br>LAVANDULÆ. *Lond. Dub.* | Lavender, *from the flowering spikes.* |
| MENTHÆ PIPERITÆ. *Ed. Lond.*<br>MENTHÆ PIPERITIDIS. *Dub.* | Peppermint, *from the herb in flower.* |
| MENTHÆ SATIVÆ. *Dub.*<br>MENTHÆ VIRIDIS. *Lond.* | Spearmint, *from the herb in flower.* |
| MYRTI PIMENTÆ. *Ed.*<br>PIMENTO. *Dub.* PIMENTÆ. *Lond.* | Pimento, *from the fruit or berry.* |
| ORIGANI MAJORANÆ. *Ed.*<br>ORIGANI. *Dub. Lond.* | Origanum, *from the herb in flower.* |
| PIMPINELLÆ ANISI. *Ed.*<br>ANISI. *Lond. Dub.* | Aniseed, *from the seeds.* |
| PULEGII. *Lond. Dub.* | Pennyroyal, *from the herb in flower.* |
| RORISMARINI OFFICINALIS. *Ed.*<br>RORISMARINI. *Dub.*<br>ROSMARINI. *Lond.* | Rosemary, *from the flowering tops.* |
| RUTÆ. *Dub.* | Rue, *from the herb in flower.* |

*Medical use.*—Volatile oils, medicinally considered, agree in the general qualities of pungency and heat; in particular virtues, they differ as much as the subjects from which they are obtained, the oil being the direct principle in which the virtues, or at least a considerable part of the virtues, of the several subjects reside. Thus, the carminative virtue of the warm seeds, the diuretic of juniper berries, the emmenagogue of savine, the nervine of rosemary, the stomachic of mint, the cordial of aromatics, &c. are supposed to be concentrated in their oils.

There is another remarkable difference in volatile oils, the foundation of which is less obvious, that of the degree of their pungency and heat. These are by no means in proportion, as might be expected, to those of the subject they were drawn from. The oil of cinnamon, for instance, is excessively pungent and fiery; in its undiluted state it is almost caustic; whereas cloves, a spice which, in substance, is far more pungent than the other, yields an oil which is much less so. This difference seems to depend partly upon the quantity of oil afforded, cinnamon yielding much less than cloves, and consequently having its active matter concentrated into a smaller volume, partly upon a difference in the nature of the active parts themselves; for though volatile oils contain always the specific odour and flavour of their subjects, whether grateful or ungrateful, they do not always contain the whole pungency: this resides frequently in a more fixed matter, and does not rise with the oil. After the distillation of cloves, pepper, and some other spices, a part of their pungency is found to remain behind; a simple tincture of them in alcohol is even more pungent than their pure essential oils.

The more grateful oils are frequently made use of for reconciling to the stomach medicines of themselves disgustful. It has been customary to employ them as correctors for the resinous purgatives, an use to which they do not seem to be well adapted. All the service they can here be of is, to make the resin sit more easily at first on the stomach; far from abating the irritating quality upon which the violence of its operation depends, these pungent oils superadd a fresh stimulus.

Volatile oils are never given alone, on account of their extreme heat and pungency; which in some is so great, that a single drop let fall upon the tongue produces a gangrenous eschar. They are readily imbibed by a piece of dry sugar, and in this form may be conveniently exhibited. Ground with eight or ten times their weight of sugar, they become soluble in aqueous liquors, and thus may be diluted to any assigned degree. Mucilages also render them miscible with water into an

uniform milky liquor. They dissolve likewise in alcohol; the more fragrant in an equal weight, and almost all of them in less than four times their own weight. These solutions may be either taken on sugar, or mixed with syrups, or the like. On mixing them with water, the liquor grows milky, and the oil separates.

The more pungent oils are employed externally against paralytic complaints, numbness, pains, and aches, cold tumours, and in other cases where particular parts require to be heated or stimulated. The toothach is sometimes relieved by a drop of these almost caustic oils, received on cotton, and cautiously introduced into the hollow tooth.

### Oleum terebinthinæ. *Dub.*
### *Oil of Turpentine.*

Take of
  Common turpentine, five pounds;
  Water, four pints.
Distil the turpentine with the water in a copper alembic. After the distillation of the oil, what remains in the retort is *yellow resin.*

### Oleum volatile pini purissimum. *Ed.*
### *Purified Oil of Turpentine.*

Take of
  Oil of turpentine, one pint;
  Water, four parts.
Distil as long as any oil comes over.

### Oleum terebinthinæ rectificatum. *Lond. Dub.*
### *Rectified Oil of Turpentine.*

Take of
  Oil of turpentine, one pint, (two pints, *Dub.*);
  Water, four pints.
Distil the oil (to the extent of a pint and a half, *Dub.*)

The rectified oil, which, in many Pharmacopœias, is styled Ethereal, is said not to have its specific gravity, smell, taste, or medical qualities, much improved by this process, which is both tedious and accompanied with danger. It must be conducted with very great care; for the vapour, which is apt to escape through the junctures of the vessel, is very inflammable.

*Medical use.*—The spirit of turpentine, as this essential oil has been styled, is frequently given internally as a diuretic and sudorific; and it has sometimes a considerable effect when taken to the extent of a few drops only. It is now, however,

used much more freely, and the strangury and bloody urine formerly dreaded from it are never observed. Two, or even three ounces are swallowed without any substance combined with it, for the cure of tænia, and emulsions of oil of turpentine are freely used to act upon the bowels in epilepsy and mania, and in some obstinate rheumatic affections.

Oil of turpentine, melted with as much ointment of yellow resin as is sufficient to give it the consistence of a liniment, constitutes the application to recent burns, so strongly recommended by Mr Kentish. He first bathes the part with heated oil of turpentine, alcohol, or tincture of camphor, and then covers it up with rags dipped in the liniment, which are to be renewed one at a time, once a-day. As the inflammation subsides, less stimulating applications are to be used; and when the secretion of pus commences, the parts are then to be covered with powdered chalk, heated to the temperature of the body. In this way, he assures us that he cured very many extensive burns in a few weeks, which, under the use of cooling applications, would have required as many months, or would have been altogether incurable.

## Chap. XX.—DISTILLED WATERS.

In the distillation of volatile oils, the water, as was observed in the preceding section, imbibes always a part of the oil. The distilled liquors here treated of, are nothing but water thus impregnated with the essential oil of the subject; whatever smell, taste, or virtue is communicated to the water, or obtained in the form of watery liquor, being found in a concentrated state in the oil.

All those vegetables, therefore, which contain an essential oil, will give over some virtue to water by distillation: but the degree of the impregnation of the water or the quantity of water which a plant is capable of saturating with its virtue, are by no means in proportion to the quantity of its oil. The oil saturates only the water that comes over at the same time with it: if there be more oil than is sufficient for this saturation, the surplus separates, and concretes in its proper form, not miscible with the water that arises afterwards. Some odoriferous flowers, whose oil is in so small quantity, that scarcely any visible mark of it appears, unless fifty or an hundred pounds or more are distilled at once, give nevertheless as

strong an impregnation to water as those plants which abound most with oil.

Many have been of opinion, that distilled waters may be more and more impregnated with the virtues of the subject, and their strength increased to any assigned degree, by *cohobation*, that is, by re-distilling them repeatedly from fresh parcels of the plant. Experience, however, shews the contrary. A water skilfully drawn in the first distillation, proves, on every repeated one, not stronger, but less agreeable. Aqueous liquors are not capable of imbibing above a certain quantity of the volatile oil of vegetables; and this they may be made to take up by one, as well as by any number of distillations: the oftener the process is repeated, the ungrateful impression which they generally receive from the fire, even at the first time, becomes greater and greater.

Those plants, which do not yield at first waters sufficiently strong, are not proper subjects for this process.

Most distilled waters, when first prepared, have a somewhat unpleasant smell, which, however, they gradually lose: it is therefore advisable to keep them for some days after their preparation in vessels but slightly covered; and not to cork them up until they lose that smell.

That the waters may keep the better, about one-twentieth part their weight of proof-spirit may be added to each after they are distilled. I have been informed by a respectable apothecary, that if the simple distilled waters be rectified by distilling them a second time, they will keep for several years without the addition of any spirit, which always gives an unpleasant flavour, and is often objectionable for other reasons.

Distilled waters are employed chiefly as grateful diluents, as suitable vehicles for medicines of greater efficacy, or for rendering disgustful ones more acceptable to the palate and stomach; few of them are depended on, with any intention of consequence, by themselves.

### AQUÆ STILLATITIÆ. *Ed.*
### *Distilled Waters.*

As much water is to be added to the substance as will be sufficient to prevent empyreuma after ten pounds are drawn off. After due maceration, draw off ten pounds, to which are to be added five ounces of weak spirit.

### AQUÆ DISTILLATÆ. *Dub.*
### *Distilled Waters.*

To each pound of water, distilled from any vegetable substance, add half an ounce measure of rectified spirit.

*Lond.*

The waters are to be distilled from the dried herbs, unless otherwise ordered, because they are not to be had fresh, at all times of the year. Whenever they are used fresh, their weight is to be doubled.

To every gallon of these waters add five fluidounces of proof-spirit, to preserve them.

AQUA DISTILLATA. *Lond.*
*Distilled Water.*

Take of

Water, ten gallons.

Draw off by distillation, first, four pints; which being thrown away, draw off four gallons, which is to be kept in a glass bottle.

*Dub.*

Take of

Spring water, twenty pints.

Put it into a glass retort, and having thrown away the first pint which comes over, draw off one gallon by distillation with a gentle heat.

*Ed.*

Let water be distilled in appropriate and very clean vessels, until about two-thirds have come over.

WATER is never found pure in a state of nature; and as it is absolutely necessary, particularly for many chemical operations, that it should be perfectly so, we must separate it from all heterogeneous matters by distillation. The first portion that comes over should be thrown away, not so much from the possibility of its being impregnated with volatile matters contained in the water, as from the probability that it will be contaminated with impurities it may have contracted in its passage through the worm in the refrigeratory. The distillation is not to be pushed too far, lest the water should acquire an empyreumatic flavour.

Although distilled water be necessary for many purposes, we apprehend that the London college, from a desire of extreme elegance, in their former edition, fell into a very considerable error, in ordering it to be employed for many purposes, such as infusions and decoctions, for which good spring water answers just as well, and for which, we will venture to say, that distilled water never is employed by the apothecary. The consequence was, that the apothecary having no rule to direct him, when it was absolutely necessary, and when it might be dispensed with, dispensed with it oftener than was proper. In the last edition they have taken care not to subject themselves to this criticism.

### AQUA ANETHI. *Lond.*
### *Dill Water.*

Take of
Dill seeds, bruised, one pound.
Pour upon them so much water, that after the distillation enough may be left to prevent empyreuma.
Draw off one gallon.

### AQUA FOENICULI DULCIS. *Dub.*
### *Fennel Water.*

Take of
The bruised seeds of sweet fennel, one pound.
Water, as much as may be sufficient to prevent empyreuma.
Distil one gallon.

IN the same manner, and in the same quantity, prepare.

| AQUA | Water of |
|---|---|
| ANETHI. *Lond.* | Dill, *from one pound of the seeds, bruised.* |
| CARUI. *Lond.* | Caraway, *from one pound of the seeds bruised.* |
| CITRI AURANTII. *Ed.* | Orange-peel, *from two pounds of the fresh peel.* |
| CITRI MEDICÆ. *Ed.* | Lemon-peel, *from two pounds of the fresh peel.* |
| FOENICULI. *Lond.* | Fennel, *from one pound of the bruised seeds.* |
| FOENICULI DULCIS. *Dub.* | Sweet Fennel, *from one pound of the seeds bruised.* |
| LAURI CASSIÆ. *Ed.* | Cassia, *from one pound of the bark bruised.* |
| LAURI CINNAMOMI. *Ed.* | Cinnamon, *from one pound of the bark bruised.* |
| CINNAMOMI. *Lond.* | Cinnamon, *from one pound of the bark bruised, and macerated for twenty-four hours in a pint of water.* |
| CINNAMOMI. *Dub.* | Cinnamon, *from one pound of the bark bruised, and macerated for a day.* |
| MENTHÆ PIPERITÆ. *Ed.* | Peppermint, *from three pounds of the herb.* |
| MENTHÆ PIPERITIDIS. *Dub.*<br>MENTHÆ PIPERITÆ. *Lond.* | ——— *from one and a half.* |
| MENTHÆ PULEGII. *Ed.* | Pennyroyal, *from three pounds of the herb.* |
| PULEGII. *Lond. Dub.* | ——— *one and a half.* |
| MENTHÆ SATIVÆ. *Dub.*<br>———VIRIDIS. *Lond.* | Spearmint, *one pound and a half.* |

| Aqua | Water of |
|---|---|
| Myrti pimentæ. *Ed.* | Pimento, *half a pound bruised.* |
| Pimento. *Dub.* | Pimento, *from half a pound bruised and macerated for a day.* |
| Pimentæ. | Pimento, *from half a pound bruised, and macerated for twenty-four hours in a pint of water.* |
| Rosæ centifoliæ. *Ed.* | Rose, *from six pounds of the recent petals.* |
| Rosæ. *Dub.* | Rose, *from six pounds of the recent petals of the Damask rose.* |
| Rosæ. *Lond.* | Rose, *from eight pounds of the petals of the hundred-leaved rose.* |

The virtues of all these waters are nearly alike; and the peculiarities of each will be easily understood, by consulting the account given in the materia medica of the substance from which they are prepared. Mr Nicolson mentions, that as rose-water is exceedingly apt to spoil, the apothecaries generally prepare it in small quantities at a time from the leaves, preserved by packing them closely in cans with common salt. This, we understand, is not the practice in Edinburgh; and, indeed, cannot succeed with the petals of the damask rose; for they lose their smell by drying. The London apothecaries, therefore, probably use the red rose. The spoiling of some waters is owing to some mucilage carried over in the distillation; for, if rectified by a second distillation, they keep perfectly well for any length of time.

## Chap. XXI.

## EMPYREUMATIC VOLATILE OILS.

Empyreumatic oils agree in many particulars with the volatile oils already treated of, but they also differ from them in several important circumstances. The latter exist ready formed in the aromatic substances from which they are obtained, and are only separated from the fixed principles by the action of a heat not exceeding that of boiling water. The former, on the contrary, are always formed by the action of a degree of heat considerably higher than that of boiling wa-

ter, and are the product of decomposition, and a new arrangement of the elementary principles of substances, containing at least oxygen, hydrogen and carbon. Their production is therefore always attended with the formation of other new products. In their chemical properties they do not differ very remarkably from the volatile oils, and are principally distinguished from them by their unpleasant pungent empyreumatic smell, and rough bitterish taste. They are also more apt to spoil by the contact of the air, and the oftener they are re-distilled, they become more limpid, less coloured, and more soluble in alcohol; whereas the essential oils, by repeated distillations, become thicker and less soluble in alcohol.

Their action on the body is exceedingly stimulant and heating.

### Oleum succini purissimum. *Ed.*
*Purified Oil of Amber.*

Distil oil of amber in a glass retort, with six times its quantity of water, till two-thirds of the water have passed into the receiver; then separate this very pure volatile oil from the water, and preserve it in very close phials.

### Oleum succini. *Lond.*
*Oil of Amber.*

Put amber into an alembic, and distil from it in a sand-bath, with a gradually increased heat, an acid liquor, oil and salt impregnated with oil. Then re-distil the oil twice.

*Dub.*

Take of
The oil which rises in the preparation of succinic acid, one pound;
Water, six pints.
Distil until two-thirds of the water have come over; then separate the oil.

The rectified oil has a strong bituminous smell, and a pungent acrid taste. Given in a dose of ten or twelve drops, it heats, stimulates and promotes the fluid secretions; it is chiefly celebrated in hysterical disorders, and in deficiencies of the uterine purgations. Sometimes it is used externally, in liniments, for weak or paralytic limbs, and rheumatic pains.

### Moschus artificialis.
*Artificial Musk.*

By treating one part of oil of amber with four of nitrous acid,

added in small portions at a time, and stirring them together with a glass rod, the oil is at last converted into a yellow resin, having the smell of musk, and known in Germany by the name of Artificial musk, where it is often used as a substitute for that expensive drug.

OLEUM CORNU CERVINI RECTIFICATUM. *Dub.*
*Rectified Oil of Hartshorn.*

Take of

The oil which ascends in the distillation of the volatile liquor of hartshorn, three pounds;

Water, six pints.

Distil the oil, and re-distil it with the water, until it becomes limpid. It ought to be kept in a dark place, and in small phials, completely filled and well corked.

ANIMAL OIL, thus rectified, is thin and limpid, of a subtile, penetrating, not disagreeable, smell and taste.

*Medical use.*—It is strongly recommended as an anodyne and antispasmodic, in doses of from 13 to 30 drops. Hoffman reports, that it procures a calm and sweet sleep, which continues often for 20 hours, without being followed by any languor or debility, but rather leaving the patient more alert and cheerful than before: that it procures likewise a gentle sweat, without increasing the heat of the blood: that, given to twenty drops or more, on an empty stomach, six hours before the accession of an intermittent fever, it frequently removes the disorder: and that it is likewise a very general remedy in inveterate and chronic epilepsies, and in convulsive motions, especially if given before the usual time of the attack, and preceded by proper evacuations. How far empyreumatic oils possess the virtues that have been ascribed to them, has not yet been sufficiently determined by experience, their tedious and troublesome rectification having prevented their coming into general use, or being often prepared. They are liable also to a more material inconvenience in regard to their medicinal use, namely, precariousness in their quality; for how perfectly soever they may be rectified, they gradually lose, on keeping, the qualities they had received from that process, and return more and more towards their original fetid state.

## Chap. XXII.—DISTILLED SPIRITS.

The flavour and virtues of distilled waters are owing, as observed in a preceding chapter, to their being impregnated with a portion of the volatile oil of the subject from which they are drawn. Alcohol, considered as a vehicle for these oils, has this advantage above water, that it keeps all the oil that rises with it perfectly dissolved into an uniform limpid liquor.

Nevertheless, many substances, which, on being distilled with water, impart to it their virtues in great perfection, if treated in the same manner with alcohol, scarcely give over to it any smell or taste. The cause of this difference is, that alcohol is not susceptible of so great a degree of heat as water. It is obvious, therefore, that some substances may be volatile enough to rise with the heat of boiling water, but not with that of boiling alcohol.

Thus, if cinnamon, for instance, be committed to distillation with a mixture of alcohol and water, or with proof-spirit, which is no other than a mixture of about equal parts of the two, the alcohol will rise first, clear, colourless and transparent, and almost without any taste of the spice; but, as soon as the more ponderous watery fluid begins to arise, the oil comes freely over with it, so as to render the liquor highly odorous, sapid, and of a milky hue.

The proof-spirit usually met with in the shops is very rarely pure, or free from unpleasant flavour, which, though concealed by means of certain additions, plainly discovers itself when employed for the preparation of distilled spirits. This nauseous flavour does not begin to arise till after the alcohol has come over, which is the very time that the virtues of the ingredients begin also to arise most plentifully; and hence the liquor receives an ungrateful taint. To this cause principally is owing the general complaint, that the cordials of the apothecary are less agreeable than those of the same kind prepared by the distiller; the latter being extremely curious in rectifying and purifying the spirits, which he uses for what he calls fine goods, from all unpleasant flavour.

SPIRITUS STILLATITII. *Ed.*
*Distilled Spirits.*

To the substance to be distilled, add nine pounds of weaker alcohol. Macerate for two days in a close vessel; then pour on as much water as will avoid empyreuma, and draw off nine pounds.

SPIRITUS CARUI. *Dub.*
*Spirit of Caraway.*

Take of
Caraway seeds, bruised, half a pound;
Proof-spirit of wine, one gallon;
Water, sufficient to prevent empyreuma.
Draw off one gallon.

*Lond.*

Take of
Bruised caraway seeds, one pound and a half;
Proof-spirit, one gallon;
Water, enough to prevent empyreuma.
Macerate for twenty-four hours; and with a slow heat, distil one gallon.

IN this manner, prepare in the same quantity

| SPIRITUS | *Spirit of* |
|---|---|
| CARI CARUI. *Ed.* | *Caraway*, from half a pound, bruised. |
| CARUI. *Dub.* | ——— half a pound, bruised. |
| ——— *Lond.* | ——— one pound and a half bruised. |
| LAURI CINNAMOMI. *Ed.*<br>CINNAMOMI. *Lond. Dub.* | *Cinnamon*, from one pound, bruised. |
| MENTHÆ PIPERITÆ. *Ed.* | *Peppermint*, one pound and a half. |
| ——————— *Lond.* | *Peppermint*, one pound and a half, dried. |
| MENTHÆ VIRIDIS. *Lond.* | *Spearmint*, one pound and a half, dried. |
| PULEGII. *Lond.* | *Pennyroyal*, one pound and a half, dried. |
| MYRISTICÆ. *Lond.*<br>MYRISTICÆ MOSCHATÆ. *Ed.*<br>NUCIS MOSCHATÆ. *Dub.* | *Nutmeg*, two ounces, bruised. |
| MYRTI PIMENTÆ. *Ed.* | *Pimento*, bruised, half a pound. |
| PIMENTO. *Dub.* | three ounces. |
| PIMENTÆ. *Lond.* | two ounces. |
| ROSMARINI. *Lond.* | *Rosemary* tops, two pounds, fresh. |
| ANISI. *Lond.* | *Aniseed*, half a pound, bruised. |

SPIRITUS LAVANDULÆ SPICÆ. *Ed.*
*Spirit of Lavender.*

Take of
Flowering spikes of lavender, fresh, two pounds;
Stronger alcohol, eight pounds.
Draw off, in a water-bath, seven pounds.

SPIRITUS LAVANDULÆ. *Lond.*
*Spirit of Lavender.*

Take of
Fresh lavender flowers, two pounds;
Rectified spirit, one gallon;
Water, sufficient to prevent empyreuma.
Macerate for twenty-four hours, and, with a slow fire, draw off one gallon.

*Dub.*

Take of
Fresh tops of lavender, one pound and a half;
Proof-spirit of wine, one gallon;
Water, sufficient to prevent empyreuma.
Draw off, by a moderate heat, five pints.

By these directions, and in the same quantity, is prepared,

SPIRITUS RORISMARINI OFFICINALIS. *Ed.* } *Rosemary*, two pounds.
SPIRITUS RORISMARINI. *Dub.* ——— a pound and a half.

It is unnecessary to make particular observations on each of these simple spirits, as their virtues are the same with those of the substances from which they are extracted, united to the stimulus of the alcohol. The alcohol in the spirits of lavender and rosemary is almost pure; in the others, it is diluted with about an equal weight of water.

SPIRITUS ANISI COMPOSITUS. *Dub.*
*Compound Spirit of Aniseed.*

Take of
Aniseed,
Angelica seed, of each, bruised, half a pound;
Proof spirit, one gallon;
Water, sufficient to prevent empyreuma.
Draw off one gallon by distillation.

THIS compound spirit, like the simple ones, is an agreeable cordial; indeed they are too agreeable, for by some they are so often resorted to, on the slightest sensation of flatulence in

the stomach, that their use is attended with all the pernicious consequences of dram-drinking.

### Spiritus juniperi compositus. *Ed.*
### *Compound Spirit of Juniper.*

Take of
- Juniper berries, bruised, one pound;
- Caraway seeds,
- Sweet fennel seeds, each, bruised, one ounce and a half;
- Weaker alcohol, nine pounds.

Macerate for two days, and having added as much water as will prevent empyreuma, draw off, by distillation, nine pounds.

### *Lond.*

Take of
- Juniper berries, bruised, one pound;
- Caraway seeds,
- Fennel seeds, of each, bruised, one ounce and a half;
- Proof-spirit, a gallon;
- Water, enough to prevent empyreuma.

Macerate for twenty-four hours, and distil, with a gentle heat, one gallon.

### *Dub.*

Take of
- Juniper berries, bruised, one pound;
- Caraway seeds,
- Sweet fennel seeds, of each, bruised, an ounce and a half;
- Proof-spirit, a gallon.

Macerate for two days, and then add as much water as will prevent empyreuma, and draw off one gallon.

The good and bad effects of this spirit exactly coincide with those of gin. The Edinburgh and Dublin colleges macerate only in the spirit; the London in the spirit and water.

### Spiritus raphani compositus. *Dub.*
### *Compound Spirit of Horse-Radish.*

Take of
- Fresh horse-radish root,
- Dried outer rind of Seville oranges, each two pounds;
- Fresh herb of garden scurvy-grass, four pounds;
- Bruised nutmegs, one ounce;
- Proof-spirit, two gallons;

Water, sufficient to prevent empyreuma.
Draw off two gallons.

SPIRITUS ARMORACIÆ COMPOSITUS. *Lond.*
*Compound Spirit of Horse-Radish.*

Take of
Fresh horse-radish root, sliced,
Dried orange-peel, of each one pound;
Nutmegs, bruised, half an ounce;
Proof-spirit, one gallon;
Water, sufficient to prevent empyreuma.
Macerate for twenty-four hours, and distil, with a slow fire, one gallon.

THIS is an aromatic acrid spiritous liquor, but has no pretensions to the specific antiscorbutic properties formerly ascribed to it.

## CHAP. XXIII.—INFUSIONS.

WE have already explained the sense in which we employ the term infusion. We confine it to the action of a menstruum, not assisted by ebullition, on any substance consisting of heterogeneous principles, some of which are soluble, and others insoluble in that menstruum. The term is generally used in a more extensive, but, we are inclined to think, a less correct, sense: thus, lime-water and the mucilages, which are commonly classed with the infusions, are instances of simple solution, and the chalk mixture is the mechanical suspension of an insoluble substance. When the menstruum used is water, the solution is termed simply an Infusion; but when the menstruum is alcohol, it is called a Tincture; when wine or vinegar, a Medicated Wine or Vinegar. Infusions in water are extremely apt to spoil, and are generally extemporaneous preparations.

AQUA CALCIS COMPOSITA. *Dub.*
*Compound Lime Water.*

Take of
Guaiac wood, in shavings, half a pound;
Liquorice root, sliced and bruised, an ounce;
Sassafras bark, bruised, half an ounce;

Coriander seeds, three drachms;
Lime-water, six pints.
Macerate, without heat, for two days, and filter.

This, notwithstanding the name, may be considered as an equivalent to the compound decoction of guaiac, as the lime water cannot fail to be decomposed during the preparation.

### Aqua picis liquidæ. *Dub.*
*Tar-Water.*

Take of
Tar, two pints;
Water, one gallon.
Mix, by stirring them with a wooden rod, for a quarter of an hour, and after the tar has subsided, strain the liquor, and keep it in well-corked phials.

Tar-water should have the colour of white wine, and a sharp empyreumatic taste. It is, in fact, a solution of empyreumatic oil, effected by means of acetic acid. It was at one time much extolled as a panacea, but has of late been little employed. It acts as a stimulant, raising the pulse, and increasing the discharge by the skin and kidneys. It may be drunk to the extent of a pint or two in the course of a-day.

### Infusum anthemidis nobilis. *Ed.*
*Infusion of Chamomile.*

Take of
Chamomile flowers, two drachms;
Water, eight ounces.
Macerate for twenty-four hours, in a slightly covered vessel, and strain.

### Infusum anthemidis. *Lond.*
*Infusion of Chamomile.*

Take of
Chamomile flowers, two drachms;
Boiling water, half a pint.
Macerate, for ten minutes, in a vessel loosely covered, and filter.

This is a very common extemporaneous prescription under the title of *chamomile tea*. It is a good stomachic.

### Infusum armoraciæ compositum. *Lond.*
*Compound Infusion of Horse-Radish.*

Take of
Fresh horse-radish root, sliced,

Mustard seed, bruised, of each one ounce;
Boiling water, one pint.
Macerate for two hours, in a loosely covered vessel, and strain; then add of
Compound spirit of horse-radish, one fluidounce.

This is a pungent and stimulant infusion.

INFUSUM AURANTII COMPOSITUM. *Lond.*
*Compound Infusion of Orange-peel.*

Take of
Orange-peel, dried, two drachms;
Lemon-peel, fresh, one drachm;
Cloves bruised, half a drachm;
Boiling water, half a pint.
Macerate for ten minutes in a loosely covered vessel, and strain.

A stomachic infusion.

INFUSUM CALUMBÆ. *Lond.* INFUSUM COLOMBÆ. *Ed.*
*Infusion of Columbo.*

Take of
Columbo root, sliced, one drachm;
Boiling water, half a pint, (eight ounces, *Ed.*)
Macerate for two hours in a loosely covered vessel, and strain.

A stomachic bitter.

INFUSUM CARYOPHYLLORUM. *Lond.*
*Infusion of Cloves.*

Take of
Cloves, bruised, one drachm;
Boiling water, half a pint.
Macerate for two hours in a vessel loosely covered, and strain.

AN aromatic stimulant.

INFUSUM CASCARILLÆ. *Lond.*
*Infusion of Cascarilla.*

Take of
Cascarilla root, bruised, half an ounce;
Boiling water, half a pint.
Macerate for two hours in a loosely covered vessel, and strain.
AN aromatic stimulant.

INFUSUM CINCHONÆ LANCIFOLIÆ. *Ed.*
*Infusion of Cinchona Bark.*

Take of
The bark of lance-leaved cinchona, in powder, one ounce;
Water, one pound.
Macerate for twenty-four hours in a slightly covered vessel, with occasional agitation, and filter.

INFUSUM CINCHONÆ. *Lond.*
*Infusion of Cinchona.*

Take of
The bark of lance-leaved cinchona, bruised, half an ounce;
Boiling water, half a pint.
Macerate for two hours in a loosely covered vessel, and strain.

INFUSUM CINCHONÆ SINE CALORE. *Dub.*
*Cold Infusion of Cinchona.*

Take of
Peruvian bark, in coarse powder, one ounce;
Cold water, twelve ounces, by measure.
Triturate the bark with a little of the water, and add the remainder during the trituration. Macerate for twenty-four hours, and decant the pure liquor.

THIS is a very elegant form of exhibiting the active principles of cinchona bark, and that in which it will sit lightest on weak and delicate stomachs. The trituration directed by the Dublin college will promote the solution. The residuum of the cold infusion may be afterwards employed in making other preparations, especially the extract, for its virtues are by no means exhausted. But it must never be dried, and sold, or exhibited in substance, for that would be a culpable fraud.

INFUSUM CUSPARIÆ. *Lond.*
*Infusion of Angustura.*

Take of
Angustura bark, bruised, two drachms;
Boiling water, half a pint.
Macerate for two hours in a loosely covered vessel, and strain.

A stimulant febrifuge.

### INFUSUM DIGITALIS. *Lond.*
*Infusion of Foxglove.*

Take of
  Foxglove leaves, dried, one drachm;
  Boiling water, half a pint.
Macerate for four hours in a loosely covered vessel, and strain; then add
  Spirit of cinnamon, half a fluidounce.

### INFUSUM DIGITALIS PURPUREÆ. *Ed.*
*Infusion of Foxglove.*

Take of
  Dried leaves of foxglove, one drachm;
  Boiling water, eight ounces;
  Spirit of cinnamon, one ounce.
Macerate the leaves in the water, for four hours, in a slightly covered vessel, then add the spirit, and filter.

THIS is the infusion so highly recommended by Withering. Half an ounce or an ounce of it may be taken twice a-day in dropsical complaints. The spirit of cinnamon is added to improve its flavour, and to counteract its sedative effects.

### INFUSUM GENTIANÆ COMPOSITUM, *vulgo* INFUSUM AMARUM. *Ed.*
*Compound Infusion of Gentian or Bitter Infusion.*

Take of
  Gentian root, sliced, half an ounce;
  Dried peel of Seville oranges, bruised;
  Coriander seeds, bruised, each one drachm;
  Diluted alcohol, four ounces;
  Water, one pound.
First pour on the alcohol, and three hours thereafter add the water; then macerate without heat, for twelve hours, in a slightly covered vessel, and strain.

*Lond.*

Take of
  The root of gentian, sliced,
  Dried orange peel, each one drachm;
  Fresh lemon-peel, two drachms;
  Boiling water, twelve fluidounces.
Macerate for an hour in a loosely covered vessel, and strain.

*Dub.*

Take of
  Bruised gentian root, two drachms;

Fresh lemon-peel, half an ounce;
Dried peel of Seville oranges, a drachm and a half;
Proof-spirit, four ounces, by measure;
Boiling water, twelve ounces, by measure.

First pour on the spirit, and after three hours the water. Lastly, after macerating two days, filter.

These formulæ are all essentially the same. The Edinburgh college employ the largest proportion of gentian; but they infuse it in cold water, which does not extract the bitter principle so quickly or so fully as boiling water, although it dissipates less of the flavour of the aromatics. The alcohol is a useful addition, both in promoting the extraction of the virtues of all the ingredients, and in preserving the infusion longer from spoiling.

*Medical use.*—Gentian is the strongest and purest of the European bitters, and readily imparts its virtues to water. These infusions are in very common use as stomachic and tonic.

### Infusum lini usitatissimi. *Ed.*
*Infusion of Linseed.*

Take of
Linseed, one ounce;
Liquorice root, bruised, two drachms;
Boiling water, two pounds.

Digest for four hours in a slightly covered vessel, and strain.

### Infusum lini. *Lond.*
*Infusion of Linseed.*

Take of
Linseed, bruised, an ounce;
Liquorice root, sliced, half an ounce;
Boiling water, two pints.

Macerate for four hours near the fire in a closely covered vessel, and strain.

This is a mucilaginous emollient liquor, much used in gonorrhœas, strangury, and in pectoral complaints.

### Infusum menthæ compositum. *Dub.*
*Compound Infusion of Mint.*

Take of
The leaves of spearmint, dried, two drachms;
Boiling water, as much as will afford six ounces of the infusion, when filtered.

Digest for half an hour, in a covered vessel; strain the liquor when cold, and then add of
Double refined sugar, two drachms;

Oil of spearmint, three drops, dissolved in
Compound tincture of cardamoms, half an ounce. Mix.

This infusion is slightly stimulating and diaphoretic, and forms a very agreeable herb-tea, which may be used in any quantity in diet, or as a vehicle for more active remedies.

### Infusum acaciæ catechu. *Ed.*
*Infusion of Catechu.*

Take of
Extract of catechu, in powder, two drachms and a half;
Cinnamon bark, bruised, half a drachm;
Boiling water, seven ounces;
Simple syrup, one ounce.

Macerate the extract and cinnamon in the water, in a covered vessel, for two hours; then strain it through linen, and add the syrup.

### Infusum catechu compositum. *Lond.*
*Compound Infusion of Catechu.*

Take of
Extract of catechu, two drachms and a half;
Cinnamon, bruised, half a drachm;
Boiling water, half a pint.

Macerate for an hour in a loosely covered vessel, and strain.

As this preparation will not keep above a day or two, it must always be made extemporaneously. The long maceration, therefore, becomes very often extremely inconvenient; but it may be prepared in a few minutes, by boiling, without in the least impairing the virtue of the medicine.

*Medical use.*—Extract of catechu is almost pure tannin. This infusion is therefore a powerfully astringent solution. The cinnamon and syrup render it sufficiently agreeable; and it will be found serviceable in diarrhœas proceeding from a laxity of the intestines. Its dose is a spoonful or two every other hour, or after every loose stool.

### Infusum quassiæ excelsæ. *Ed.*
*Infusion of Quassia.*

Take of
Shavings of quassia wood, half a drachm;
Boiling water, eight ounces.

Macerate for two hours in a slightly covered vessel, and strain.

INFUSUM QUASSIÆ. *Lond.*
*Infusion of Quassia.*

Take of
Quassia shavings, a scruple;
Boiling water, half a pint.
Macerate for two hours in a loosely covered vessel, and strain.

ONE of the most intense and purest bitters.

INFUSUM RHEI. *Ed.*
*Infusion of Rhubarb.*

Take of
Russian rhubarb, bruised, half an ounce;
Boiling water, eight ounces;
Spirit of cinnamon, one ounce.
Macerate the rhubarb in a close vessel with the water for twelve hours; then add the spirit, and strain the infusion.

*Lond.*

Take of
Rhubarb, sliced, a drachm;
Boiling water, half a pint.
Macerate for two hours in a loosely covered vessel, and strain.

THIS appears to be one of the best preparations of rhubarb, when not designed as a purgative; water extracting its virtues more effectually than either vinous or spirituous menstrua.

INFUSUM ROSÆ GALLICÆ. *Ed.*
*Infusion of Roses.*

Take of
The petals of red roses, dried, one ounce;
Boiling water, two pounds and a half;
Diluted sulphuric acid, half an ounce;
White sugar, one ounce.
Macerate the petals with the boiling water in an earthen vessel, which is not glazed with lead, for four hours, then add the acid, strain the liquor, and dissolve the sugar in it.

INFUSUM ROSÆ. *Lond.*
*Infusion of Roses.*

Take of
Dried petals of red roses, half an ounce;
Boiling water, two pints and a half;
Diluted sulphuric acid, three fluidrachms;
Double refined sugar, an ounce and a half.
First pour the water on the petals in a glass vessel,

then add the diluted sulphuric acid, and macerate for half an hour. Strain the liquor, and add the sugar.

*Dub.*

Take of

The petals of red rose buds, dried and heeled, half an ounce;
Diluted sulphuric acid, three drachms, by weight;
Boiling water, three pints.
Double refined sugar, an ounce and a half.

First pour the water on the petals in a glass vessel, then add the acid, and digest for half an hour; filter the liquor when cold, and add the sugar.

THE differences in the directions for preparing this infusion are immaterial. In fact, the rose leaves have very little effect, except in giving the mixture an elegant red colour. Its subacid and astringent virtues depend entirely on the sulphuric acid. Altogether, however, it is an elegant medicine, and forms a very grateful addition to juleps in hæmorrhagies, and in all cases which require mild coolers and sub-astringents: it is sometimes taken with boluses or electuaries of Peruvian bark, and likewise makes a good gargle.

INFUSUM CASSIÆ SENNÆ. *Ed.*
*Infusion of Senna.*

Take of

Senna leaves, six drachms;
Ginger root, bruised, one scruple;
Boiling water, nine ounces.

Macerate for an hour in a slightly covered vessel, and strain.

INFUSUM SENNÆ. *Lond.*
*Infusion of Senna.*

Take of

Senna leaves, an ounce and a half;
Ginger root, sliced, one drachm;
Boiling water, one pint.

Macerate them for an hour in a loosely covered vessel, and strain.

*Dub.*

Take of

Senna, three drachms;
Lesser cardamom seeds, husked and bruised, half a drachm;
Boiling water, as much as will yield a filtered infusion of six ounces.

Digest for an hour, and filter when cold.

This is a well-contrived purgative infusion, the aromatic correcting the drastic effects of the senna. But the quantity ordered to be prepared at one time, by the London college, is much too large; for an ounce or two is a sufficient dose. It is of advantage that it should be used fresh prepared, as it is apt to spoil very quickly.

### Infusum sennæ compositum. *Ed.*
*Infusion of Compound Senna.*

Take of
- Preserved tamarinds, one ounce;
- Senna leaves, one drachm;
- Coriander seeds, bruised, one drachm;
- Brown sugar, half an ounce;
- Boiling water, eight ounces.

Macerate for four hours, with occasional agitation, in a close earthen vessel, not glazed with lead, and strain the infusion.

It may also be made with double, triple, &c. the quantity of senna.

### Infusum sennæ cum tamarindis. *Dub.*
*Infusion of Senna with Tamarinds,*

Is made as the infusion of senna, by adding, before the water is poured on, an ounce of tamarinds; then strain.

This forms a mild and useful purge, excellently suited for delicate stomachs, and inflammatory diseases. The taste of the senna is well covered by the acidity of the tamarinds.

### Infusum simaroubæ. *Lond.*
*Infusion of Simarouba.*

Take of
- Simarouba bark bruised, half a drachm;
- Boiling water, half a pint.

Macerate for two hours in a loosely covered vessel, and strain.

A bitter aromatic.

### Infusum tabaci. *Lond.*
*Infusion of Tobacco.*

Take of
- Tobacco leaves, a drachm;
- Boiling water, a pint.

Macerate for an hour in a loosely covered vessel, and strain.

This is a narcotic diuretic, which was used with much success in dropsies by Dr Fowler.

INFUSUM VALERIANÆ. *Dub.*
*Infusion of Valerian.*

Take of
Valerian root, in coarse powder, two drachms;
Boiling water, seven ounces, by measure;
Digest for half an hour, and strain when cold.

VALERIAN tea is a very excellent antispasmodic, and often proves serviceable in hysteric cases, where the stomach will not bear the powder in substance.

## CHAP. XXIV.—DECOCTIONS.

DECOCTIONS differ from infusions only in the action of the menstruum being assisted by a boiling heat. At the same time, however, that the increase of temperature facilitates and expedites the solution of some fixed principles, it gives others a tendency to decomposition, and dissipates all volatile matters. Decoction, therefore, can only be used with advantage for the extraction of principles which are neither volatilized nor altered by a boiling heat.

To promote the action of the menstruum, infusion is sometimes premised to decoction.

In compound decoctions, it is sometimes convenient not to put in all the ingredients from the first, but in succession, according to their hardness, and the difficulty with which their virtues are extracted; and if any aromatic, or other substances, containing volatile principles, enter into the composition, the boiling decoction is to be simply poured upon them, and covered up until it cool.

Decoctions should be made in vessels sufficiently large to prevent any risk of boiling over, and should be continued without interruption, and gently.

DECOCTUM ALOES COMPOSITUM. *Lond.*
*Compound Decoction of Aloes.*

Take of
Extract of liquorice, half an ounce;
Subcarbonate of potass, two scruples;
Extract of spiked aloes, in powder,
Myrrh, in powder,
Saffron, of each one drachm;
Water, one pint.

Boil down to twelve fluidounces, and strain; then add of Compound tincture of cardamoms, four fluidounces.

This is intended as a simplification and improvement of the *Baume de Vie de la Lièvre*. It is in fact a saponaceous solution of aloes, the subcarbonate of potass rendering its resin soluble in water; and in many cases of stomach complaints, the combination of an alkali with a bitter purgative may be advantageous. In the dose of two or three tea-spoonfuls it is slightly purgative. The original *Baume de vie*, which, however, contained no alkali, was much employed externally as a detersive application to recent wounds, and to prevent suppuration.

### Decoctum althææ officinalis. *Ed.*
### *Decoction of Marshmallows.*

Take of
Dried marshmallow roots, bruised, four ounces;
Raisins, stoned, two ounces;
Water, seven pounds.
Boil down to five pounds; strain the decoction, and after the fæces have subsided, pour off the liquor.

Marshmallow roots contain nothing soluble in water, except mucilage, which is very abundant in them. This decoction is therefore to be considered merely as an emollient, rendered more pleasant by the acidulous sweetness of the raisins.

### Decoctum anthemidis nobilis. *Ed.*
### *Decoction of Chamomile.*

Take of
Chamomile flowers, dried, one ounce;
Caraway seeds, bruised, half an ounce;
Water, five pounds.
Boil for a quarter of an hour, and strain.

### Decoctum chamæmeli compositum. *Dub.*
### *Compound Decoction of Chamomile.*

Take of
Chamomile flowers, dried, half an ounce;
Sweet fennel seeds, two drachms;
Water, one pint.
Boil a little, and strain.

### Decoctum malvæ compositum. *Lond.*
*Compound Decoction of Mallow.*

Take of
The leaves of mallow, dried, one ounce;
Chamomile flowers, dried, half an ounce;
Water, one pint.
Boil for fifteen minutes, and strain.

These decoctions are merely solutions of bitter extractive, combined, in the third with mucilage, and in the others with aromatics. In making them, the aromatic substances should not be added until the decoction is nearly completed; for, otherwise, their flavour would be entirely dissipated.

It must, however, be acknowledged, that these impregnations are for the most part unnecessary for the purpose of glysters; and, in general, the bulk and warmth of these produce a discharge before these medicines can have any effect.

As fomentations, their virtues also depend, in a great measure, on the warm water, of which they principally consist; and when the herbs themselves are applied, they act only as retaining heat and moisture for a longer time; and are a less convenient, and not more useful fomentation, than cloths wrung out of hot water, or, what is still better, bladders half filled with hot water.

### Decoctum cinchonæ lancifoliæ. *Ed.*
*Decoction of Cinchona Bark.*

Take of
Lance-leaved cinchona bark, bruised, one ounce;
Water, one pound and a half.
Boil for ten minutes in a covered vessel, and strain the liquor while hot.

### Decoctum cinchonæ. *Lond.*
*Decoction of Cinchona.*

Take of
Lance-leaved cinchona bark, bruised, one ounce;
Water, one pint.
Boil for ten minutes in a loosely covered vessel, and strain the liquor while hot.

### Decoctum corticis cinchonæ. *Dub.*
*Decoction of Cinchona Bark.*

Take of
Peruvian bark, in coarse powder, one ounce;
Water, one pint.
Boil for ten minutes in a vessel almost covered, and strain the liquor while hot, through linen.

Cinchona bark readily yields its active principles to the action of boiling water, and in greater quantity than cold water is capable of retaining dissolved; therefore, when a saturated decoction cools, it becomes turbid, and there is always a deposition of a yellowish or reddish powder, while the supernatant liquor is reduced to the strength of a saturated cold infusion. Decoction therefore presents us with an easy means of obtaining immediately an active preparation of cinchona bark, and with one of greater strength, than a cold, or even a warm infusion, provided it be drunk while tepid, and before it forms any deposition, or if the precipitate be diffused by agitation, after it is formed. As the precipitate contains no woody fibre, or other inert matter, it is extremely probable that, in very small doses, it would prove, if dried, a very powerful preparation of cinchona bark.

Formerly it was supposed that the strength of a decoction of cinchona bark, and similar substances, was increased by continuing the boiling for a great length of time; but this is now known to be a mistake, because water, at different temperatures, is capable of dissolving only a determinate proportion of its active principles; and therefore, as soon as it is saturated, any farther decoction is unnecessary. But, moreover, these principles, when dissolved in water, are liable to be decomposed, and become inert, by the absorption of atmospheric oxygen; and this decomposition is increased by increase of temperature; and as boiling constantly presents new surfaces to the action of the air, it is evidently hurtful when protracted longer than what is just necessary to saturate the water. Ten minutes is now supposed by the colleges to be sufficient for that purpose.

### Decoctum daphnes mezerei. *Ed.*
### *Decoction of Mezereon.*

Take of
- The bark of mezereon, two drachms;
- Liquorice root, bruised, half an ounce;
- Water, three pounds.

Boil with a gentle heat, down to two pounds, and strain the decoction.

From four to eight ounces of this decoction may be given four times a-day, in some obstinate syphiloid and rheumatic affections. It operates chiefly by perspiration.

### DECOCTUM DIGITALIS. *Dub.*
*Decoction of Foxglove.*

Take of
- Foxglove leaves, dried, one drachm;
- Water, as much as will furnish a strained decoction of eight ounces, by measure.

Place the vessel upon a slow fire, and, as soon as the liquor boils, remove it; then digest for a quarter of an hour, and strain.

THIS decoction, according to the proportions employed, is twenty times weaker than that so much praised by Dr Darwin; but with a medicine of so great activity, it is an advantage to be able to regulate the doses easily; and it is probable that the strength of decoctions is not increased in proportion as the quantity of the menstruum is diminished.

### DECOCTUM GEOFRÆÆ INERMIS. *Ed.*
*Decoction of Cabbage-tree Bark.*

Take of
- Bark of the cabbage-tree, powdered, one ounce;
- Water, two pounds.

Boil, with a gentle fire, down to one pound, and strain the decoction.

THIS is a powerful anthelmintic. It may be given in doses of one table-spoonful to children, and four to adults. If disagreeable symptoms should arise from an over-dose, or from drinking cold water during its action, we must immediately purge with castor oil, and dilute with acidulated fluids.

### DECOCTUM GUAIACI COMPOSITUM. *Ed.*
*Compound Decoction of Guaiacum.*

Take of
- Guaiacum raspings, three ounces;
- Raisins, two ounces;
- Sassafras root, sliced,
- Liquorice root, bruised, each one ounce;
- Water, ten pounds.

Boil the guaiacum and raisins with the water, over a gentle fire, down to five pounds, adding, towards the end, the sassafras and liquorice, and strain the decoction.

THIS decoction is of use in some rheumatic and cutaneous affections. It may be taken by itself to the quantity of a quarter of a pint, twice or thrice a-day, or used as an assistant in a course of mercurial or antimonial alteratives; the patient, in either case, keeping warm, in order to promote the operation of the medicine.

### DECOCTUM DULCAMARÆ. *Lond.*
*Decoction of Bittersweet.*

Take of
 Twigs of bittersweet, sliced, one ounce;
 Water, one pint and a half.
Boil to a pint and strain.

FOR the virtues of this decoction, I must refer to what is said in the Materia Medica.

### DECOCTUM HORDEI DISTICHI. *Ed.* DECOCTUM HORDEI. *Dub.*
*Decoction of Barley. Barley Water.*

Take of
 Pearl barley, two ounces;
 Water, five pounds.
First wash off the mealy matter which adheres to the barley with some cold water; then extract the colouring matter, by boiling it a little with about half a pint of water. Throw this decoction away, and put the barley thus purified into five pints of boiling water, which is to be boiled down to one half, and strain the decoction.

### DECOCTUM HORDEI. *Lond.*
*Decoction of Barley.*

Take of
 Pearl barley, two ounces;
 Water, four pints and a half.
First wash off all foreign matters from the barley with cold water; then add half a pint of the water, and boil a little. Throw this water away, and pour on the remaining water boiling hot; boil down to two pints, and strain.

### DECOCTUM HORDEI COMPOSITUM. *Dub.*
*Compound Decoction of Barley.*

Take of
 The decoction of barley, four pints;
 Raisins, stoned, two ounces;
 Figs, sliced, two ounces.
 Liquorice root, sliced and bruised, half an ounce.
During the boiling, add first the raisins, and then the figs, and lastly the liquorice, a short time before it is finished, when the strained decoction ought to measure two pints.

*Lond.*

Take of
 Decoction of barley, two pints;

Figs, sliced, two ounces;
Liquorice root, sliced and bruised, half an ounce;
Raisins, stoned, two ounces;
Water, one pint.

Boil down to two pints and strain.

These liquors are to be used freely, as diluting drinks, in fevers and other acute disorders; hence it is of consequence that they should be prepared so as to be as elegant and agreeable as possible: for this reason they are inserted in the Pharmacopœia, and the several circumstances which contribute to their elegance set down; for if any one of them be omitted, the beveridge will be less grateful. As, however, they are much oftener prepared by nurses and servants than by the apothecary, these receipts might, with great advantage, be substituted for the ridiculous, and often dangerous, specifics with which domestic cookery-books abound. However trivial medicines of this class may appear to be, they are of greater importance in the cure of acute diseases than many more elaborate preparations.

### Decoctum lichenis islandici. *Ed.*
*Decoction of Iceland Moss.*

Take of
Iceland moss, one ounce;
Water, two pounds.

Boil down to sixteen ounces, and strain.

*Dub.*

Take of
Iceland moss, half an ounce;
Boiling water, a pint.

Digest for two hours in a close vessel; then boil for a quarter of an hour, and strain the liquor while hot.

### Decoctum lichenis. *Lond.*
*Decoction of Iceland Moss.*

Take of
Iceland moss, one ounce;
Water, a pint and a half.

Boil to a pint, and strain.

I have already given my opinion of the nature and effects of this mucilage. As in the present preparation the bitter principle is not removed, it may have some action as a tonic; but it renders it at the same time too nauseous to be used in sufficient quantity to have much effect as an article of diet.

### Decoctum papaveris. *Lond.*
*Decoction of Poppies.*

Take of
White poppy heads, sliced, four ounces ;
Water, four pints.
Boil for a quarter of an hour, and strain.

This is in very common use, as an anodyne fomentation.

### Decoctum polygalæ senegæ. *Ed.*
*Decoction of Seneka.*

Take of
Seneka root, one ounce ;
Water, two pounds.
Boil down to sixteen ounces, and strain the decoction.

### Decoctum senegæ. *Lond.*
*Decoction of Snake Root.*

Take of
Snake root, one ounce ;
Water, two pints.
Boil to one pint, and strain.

The virtues of this decoction will be easily understood from those of the root from which it is prepared. The dose in hydropic cases, and rheumatic or arthritic complaints, is two ounces, three or four times a-day, according to its effect. It is also recommended, in affections of the lungs, attended with debility, and inordinate secretion.

### Decoctum quercus roboris. *Ed.*
*Decoction of Oak Bark.*

Take of
Oak bark, bruised, one ounce ;
Water, two pounds and a half;
Boil down to sixteen ounces, and strain.

### Decoctum quercus. *Lond.*
*Decoction of Oak Bark.*

Take of
Oak bark, one ounce ;
Water, two pints.
Boil to one pint, and strain.

This is a very powerful astringent, and may be used on all occasions where astringents are indicated. It is particularly serviceable as a gargle in sore throats and hoarseness, attended with relaxation of the parts.

DECOCTUM SMILACIS SARSAPARILLÆ. *Ed.*
*Decoction of Sarsaparilla.*

Take of
The root of sarsaparilla, sliced, six ounces;
Water, eight pounds.

Digest for two hours, with a heat of about 195°; then take out the root, and bruise it; when bruised, put it back into the same liquor, boil down to four pounds, then press out, and strain the decoction.

DECOCTUM SARSAPARILLÆ. *Dub.*
*Decoction of Sarsaparilla.*

Take of
Sarsaparilla root, sliced, an ounce and a half;
Boiling water, two pints.

Digest in a moderate heat, for two hours; then take out the sarsaparilla and bruise it; when bruised, put it back into the liquor, and repeat the digestion for two hours; then express the liquor, after it has been reduced to one half, through linen, and strain it.

*Lond.*

Take of
Sarsaparilla, sliced, four ounces;
Boiling water, four pints.

Macerate for four hours in a loosely covered vessel, at the side of the fire; then take out the sarsaparilla root, and bruise it. When bruised put it again into the liquor; macerate for two hours more, then boil down to two pints, and strain.

THE diaphoretic effects of this decoction are probably owing to its being drunk warm. By some it is thought useful in the sequelæ of syphilis, and in syphiloid affections its good effects are generally allowed.

DECOCTUM SARSAPARILLÆ COMPOSITUM. *Dub.*
*Compound Decoction of Sarsaparilla.*

Take of
Sarsaparilla, sliced and bruised, an ounce and a half;
Shavings of guaiacum wood,
Bark of the root of sassafras,
Liquorice root, bruised, of each two drachms;
Bark of mezereon root, one drachm;
Boiling water, three pints.

Macerate in the water, with a gentle heat, for six hours, the sarsaparilla, guaiac, and sassafras; then boil it down to one

half, adding, towards the end of the boiling, the liquorice and mezereon, and strain the liquor.

*Lond.*

Take of
Decoction of sarsaparilla, boiling hot, four pints;
Sassafras root, sliced,
Guaiac raspings,
Liquorice root, bruised, of each an ounce;
The bark of mezereon root, three drachms.
Boil for a quarter of an hour, and strain.

This compound decoction is said to be an improved mode of preparing the once highly celebrated Lisbon diet-drink, which, after its first introduction into Britain, was so long kept a secret.

It operates as a diaphoretic, and may be given with advantage in rheumatic cases, and in some of the sequelæ of syphilis. Three or four ounces may be taken four times a-day.

### Decoctum ulmi. *Lond. Dub. Ed.*
*Decoction of Elm.*

Take of
The fresh inner bark of elm, bruised, four ounces;
Water, four pints, (four pounds. *Ed.*)
Boil to two pints, (two pounds and a half. *Ed.*)

Under this form the elm bark has been highly celebrated for the cure of certain cutaneous eruptions, but undeservedly, according to the experience of the most judicious practitioners.

### Decoctum veratri. *Lond.*
*Decoction of White Hellebore.*

Take of
The root of white hellebore, in powder, one ounce;
Water, two pints;
Rectified spirit of wine, two fluidounces.
Boil the water with the root to one pint, and strain; after the liquor is cold, add to it the spirit.

This decoction is only used externally as a wash in tinea capitis, lepra, psora, &c. When the skin is very tender and irritable, it should be diluted with an equal quantity of water.

## Chap. XXV.—MUCILAGES.

### Mucilago amyli. *Dub.*
*Mucilage of Starch.*

Take of

Starch, half an ounce;

Water, one pint.

Triturate the starch, gradually adding the water; then boil them a little.

*Ed. Lond.*

Take of

Starch, three drachms;

Water, one pint.

Triturate the starch with the water, gradually added, and boil, till it become a mucilage.

The mucilage thus formed is very useful in those cases where a glutinous substance is required; it is often successfully employed as a glyster, in diarrhœas depending on acrimony in the intestines.

### Mucilago astragali tragacanthæ. *Ed.*
*Mucilage of Gum Tragacanth.*

Take of

Gum tragacanth, in powder, two drachms;

Boiling water, eight ounces.

Macerate for twenty-four hours, then triturate carefully, that the gum may be dissolved; and press the mucilage through a linen cloth.

### Mucilago gummi tragacanthæ. *Dub.*
*Mucilage of Gum Tragacanth.*

Take of

Gum tragacanth, in powder, two drachms;

Water, eight ounces, by measure.

Macerate in a close vessel, till the gum be dissolved; then strain the mucilage through linen.

Gum tragacanth is difficultly soluble in water. When macerated in it, it swells, but does not dissolve. To effect the solution, it must be beaten into a paste with some of the water, and the rest of the water must be added gradually,

and incorporated with the paste, by beating them together. Gum tragacanth is a very tenacious substance, and requires a very large proportion of water to form a fluid mucilage.

MUCILAGO ACACIÆ ARABICÆ. *Ed.*
*Mucilage of Gum Arabic.*

Take of
Gum Arabic, in powder, one part;
Boiling water, two parts.
Digest with frequent agitation until the gum be dissolved; then press the mucilage through linen.

MUCILAGO ACACIÆ. *Lond.*
*Mucilage of Acacia.*

Take of
Gum Arabic in powder, four ounces;
Boiling water, half a pint.
Triturate the gum with the water, gradually added until it be dissolved.

MUCILAGO GUMMI ARABICI. *Dub.*
*Mucilage of Gum Arabic.*

Take of
Gum Arabic, in coarse powder, four ounces;
Boiling water, eight ounces by measure.
Digest with frequent agitation till the gum be dissolved, then strain the mucilage through linen.

IT is very necessary to pass the mucilage through linen, in order to free it from pieces of wood and other impurities which always adhere to the gum: the linen may be placed in a funnel.

Mucilage of gum arabic is very useful in many operations in pharmacy; it is also much used for properties peculiar to substances of its own class; and of all the gums, it seems to be the purest.

DECOCTUM CYDONIÆ. *Lond.*
*Decoction of Quince-seed.*

Take of
Quince-seeds, two drachms;
Water, one pint.
Boil, with a slow fire, for ten minutes, and strain.

THIS mucilage, though sufficiently agreeable, is perfectly superfluous, especially as it is apt to spoil, from being mixed with the other principles of the seeds soluble in water. It is, besides, never so transparent as mucilage carefully pre-

pared from gum arabic, is not cheaper, and is unfit for many purposes, being coagulated by acids.

## Chap. XXVI.—SYRUPS.

SYRUPI. *Dub.*
*Syrups.*

In making syrups, where neither the weight of the sugar, nor the manner in which it should be dissolved are directed, the following rule is to be followed:

Take of
Double refined sugar, in fine powder, twenty-nine ounces;
The liquor prescribed, one pint.

Gradually add the sugar, and digest with frequent agitation, in a close vessel, and in a moderate heat, until it be dissolved; then set it aside for twenty-four hours; take off the scum, and pour off the syrup from the fæces, if there be any.

*Lond.*

Syrups are to be kept in a place whose temperature never exceeds 50° Fahr.

Syrups are solutions of sugar in any watery fluid, whether simple or medicated. Simple syrup is nutritious and demulcent. When made of fine sugar, it is transparent and colourless. If necessary, it is easily clarified, by beating to a froth the white of an egg, with three or four ounces of water, mixing it with the syrup, and boiling the mixture for a few seconds, until the albumen coagulates, and enveloping all heterogeneous matters, forms a scum, which may be easily taken off, or separated by filtration. When, instead of simple water, any other fluid is used for dissolving the sugar, the syrup is then said to be medicated. Medicated syrups are prepared with expressed juices, infusions, decoctions, or saline fluids. The object of forming these into syrups is either to render them agreeable to the palate, or to preserve them from fermentation. In the latter case, the quantity of sugar added becomes a matter of great importance; for, if too much be employed, the sugar will separate by crystallization; and, if too little, instead of preventing fermentation, it will accelerate it. About two parts of sugar to one of fluid are the proportions directed by the British col-

leges with this view. But, as in some instances a larger quantity of fluid is added, and afterwards reduced to the proper quantity by decoction, it will not be superfluous to point out some circumstances, which shew the evaporation to be carried far enough. These are the tendency to form a pellicle on its surface, when a drop of it is allowed to cool; the receding of the last portion of each drop, when poured out drop by drop, after it is cold; and what is most to be relied on, its specific gravity when boiling hot, being about 1.3; or 1.385, when cold. The syrup which remains, after all the crystallizable sugar has been separated from it, has been much, and probably justly, recommended by some for the preparation of medicated syrups and electuaries, although its pharmaceutical superiority is actually owing to its impurity.

### SYRUPUS SIMPLEX. *Ed.*
*Simple Syrup.*

Take of
Refined sugar, fifteen parts;
Water, eight parts.
Let the sugar be dissolved by a gentle heat in the water, and boiled a little, so as to form a syrup.

### SYRUPUS SIMPLEX. *Lond.*
*Simple Syrup.*

Take of
Refined sugar, two pounds and a half;
Water, one pint.
Dissolve the sugar in the water, in a water-bath; let it stand for twenty-four hours, then skim it, and decant off the pure syrup from the fæces, if there be any.

SIMPLE syrup should have neither flavour nor colour, and is more convenient in extemporaneous prescriptions than sugar undissolved.

### SYRUPUS ALTHÆÆ OFFICINALIS. *Ed.*
*Syrup of Marshmallow.*

Take of
Fresh marshmallow roots, sliced, one part;
Water, ten parts;
Refined sugar, four parts.
Boil the water with the roots, down to one half, and strain the liquor, with strong expression. Set aside the strained decoction till the fæces have subsided; add the sugar to the depurated decoction, and boil so as to make a syrup.

### Syrupus althææ. *Lond.*
### *Syrup of Marshmallow.*

Take of
Fresh root of marshmallow, bruised, half a pound;
Refined sugar, two pounds;
Water, four pints.

Boil the water with the marshmallow root to one-half, and press out the liquor when cold. Set it at rest for twenty-four hours; and after the fæces have subsided, pour off the decoction. Add the sugar, and boil it to a proper consistence.

This is merely a mucilaginous syrup, and is chiefly used in nephritic cases, for sweetening emollient decoctions, and the like.

### Syrupus dianthi caryophylli. *Ed.*
### *Syrup of Clove July-flower.*

Take of
Clove July-flowers, fresh gathered and freed from the heels, one part;
Boiling water, four parts;
Refined sugar, seven parts.

Macerate the petals in the water for twelve hours; and dissolve in the filtered infusion the sugar in powder, by a gentle heat, so as to form a syrup.

### Syrupus caryophylli rubri. *Dub.*
### *Syrup of Clove July-flower.*

Take of
The petals of fresh clove July-flowers, without the heels, two pounds;
Boiling water, six pints.

Macerate for twelve hours in a glass vessel; and in the strained liquor dissolve refined sugar, so as to form a syrup.

As the beauty of the colour is principally attended to in this syrup, no force should be used in expressing the infusion from the flowers.

Some have substituted to it one easily prepared at seasons when the flowers are not to be procured: An ounce of spice-cloves is infused for some days in twelve ounces of white wine, the liquor strained, and with the addition of twenty ounces of sugar, boiled to the proper consistence of a syrup, to which a little cochineal gives a colour exactly similar to that prepared from the clove July-flower; and its flavour is of the same kind, though not so pleasant. The counterfeit may be readily detected, by adding to a little of the syrup

some alkaline salt or ley; which will change the genuine syrup to a green colour; but, in the counterfeit, it will make no such alteration, only varying the shade of the red.

### Syrupus croci. *Lond.*
### *Syrup of Saffron.*

Take of
Saffron, one ounce;
Boiling water, one pint;
Refined sugar, two pounds and a half.
Macerate the saffron in the water for twelve hours, in a loosely covered vessel; and dissolve the sugar in the strained liquor.

Saffron is very well fitted for making a syrup. It is said to be a pleasant cordial, and gives a fine colour to juleps.

### Syrupus toluiferæ balsami. *Ed.*
### *Syrup of Balsam of Tolu.*

Take of
Common syrup, two pounds;
Tincture of balsam of Tolu, one ounce.
With the syrup just prepared, and when it has almost grown cold, after having been removed from the fire, gradually mix the tincture with constant agitation.

### Syrupus tolutanus. *Lond.*
### *Syrup of Tolu.*

Take of
The balsam of Tolu, one ounce;
Boiling water, one pint;
Refined sugar, two pounds.
Boil the balsam in the water for half an hour in a covered vessel, stirring it occasionally; strain the liquor when cold, and add the sugar as in making simple syrup.

The intention of the contrivers of the two foregoing processes seems to have been somewhat different. In the latter, which is certainly the most elegant, the benzoic acid of the balsam alone is contained; the other syrup contains the whole substance of the balsam in larger quantity. They are both moderately impregnated with the agreeable flavour of the balsam.

### Syrupus violæ odoratæ. *Ed.*
### *Syrup of Violets.*

Take of
Fresh violets, two parts;

Boiling water, eight parts;
Refined sugar, fifteen parts.

Macerate the violets in the water, for twenty-four hours, in a covered glass or glazed earthen vessel; then strain without expression, and to the strained infusion add the sugar.

### SYRUPUS VIOLÆ. *Dub.*
*Syrup of Violets.*

Take of
The fresh petals of the violet, two pounds;
Boiling water, five pints.

Macerate for twenty-four hours; afterwards strain the liquor, without expression, through thin linen. Add double refined sugar, that it may be made a syrup.

THIS syrup has a very agreeable flavour; and, in the quantity of a spoonful or two, proves to children gently laxative. It is apt to lose, in keeping, the elegant blue colour, for which it is chiefly valued; and hence some have been induced to counterfeit it, with materials whose colour is more permanent, and which are more easily obtained. If the syrup be genuine, acids will change it red, and alkalies green; but if counterfeit, these changes will not happen. From this mutability of colour, the syrup of violet forms an excellent test of the presence of acids and alkalies; and it is also obvious that a prescriber would be deceived, if he should expect, by means of it, to give a red tinge to acidulated, or blue to alkalized juleps or mixtures.

### SYRUPUS ROSÆ GALLICÆ. *Ed.*
*Syrup of Red Roses.*

Take of
The dried petals of red roses, one part;
Refined sugar, two parts;
Boiling water, nine parts.

Macerate the rose leaves in the water, for twelve hours; then boil a little, and strain the liquor; add to it the sugar, and boil again for a little, so as to form a syrup.

THIS syrup is supposed to be mildly astringent, but is principally valued on account of its red colour.

### SYRUPUS ROSÆ CENTIFOLIÆ. *Ed.*
*Syrup of Hundred-leaved Roses.*

Take of
The fresh petals of the hundred-leaved rose, one part;
Boiling water, four parts;
Refined sugar, three parts;

Macerate the petals in the water for twelve hours; then to the strained infusion add the sugar, and boil them into a syrup.

SYRUPUS ROSÆ. *Lond.*
*Syrup of Roses.*

Take of
The dried petals of the hundred-leaved rose, seven ounces;
Refined sugar, six pounds;
Boiling water, four pints.

Macerate the roses in the water for twelve hours, and strain. Evaporate the strained liquor, in a water-bath, to two pints and a half, and add the sugar, as directed for making syrup.

THIS syrup is an agreeable and mild purgative for children, in the dose of half a spoonful, or a spoonful. It likewise proves gently laxative to adults; and with this intention may be of service in costive habits.

SYRUPUS CASSIÆ SENNÆ. *Ed.*
*Syrup of Senna.*

Take of
Senna leaves, two ounces;
Boiling water, a pound and a half;
Molasses, eight ounces.

Macerate the leaves in the water in a slightly covered vessel for four hours, and strain, then add the syrup, and boil with a gentle heat to the thickness of the molasses.

SYRUPUS SENNÆ. *Dub.*
*Syrup of Senna.*

Take of
Manna,
Refined sugar, each one pound;
Senna, half an ounce;
Boiling water, a pint.

Macerate the senna in the water, in a covered vessel, for twelve hours; then, with the strained liquor, mix the manna and the sugar, so that they may be dissolved.

*Lond.*

Take of
Senna leaves, two ounces;
Fennel seeds, bruised, one ounce;
Manna, three ounces;
Refined sugar, one pound;
Boiling water, a pint.

Macerate with a gentle heat the senna leaves and seeds in the

water for twelve hours. Strain the liquor, and mix with it the manna and sugar, then boil to a proper thickness.

This preparation, which is intended to be an officinal substitute for an excellent nursery purgative, is a proof of the impropriety of colleges sanctioning prescriptions which they have not brought to the test of experiment. Mr Phillips found, that the proportions as given by the Dublin college yielded, instead of a fluid syrup, a substance so thick, that it could not even be shaked out of an inverted vessel, owing to the crystallization of the manna. Treacle is the best addition for forming infusion of senna into a syrup, as it has no tendency to crystallize, and covers its taste so completely, that children take it readily.

### Syrupus rhamni. *Lond.*
### *Syrup of Buckthorn.*

Take of
The fresh juice of buckthorn berries, four pints;
Ginger, sliced,
Pimento, powdered, each half an ounce;
Refined sugar, three pounds and a half.

Set aside the juice for three days that the fæces may subside, and then strain it. To one pint of the defæcated juice, add the ginger and pimento; then macerate with a gentle heat for four hours, and filter. Boil away the rest of the juice to one pint and a half; mix the liquors, and add the sugar as directed for making syrup.

This preparation, in doses of three or four spoonfuls, operates as a brisk cathartic. The principal inconveniences attending it are, its being very unpleasant, and its occasioning a thirst and dryness of the mouth and fauces, and sometimes violent gripes; these effects may be prevented by drinking liberally of water gruel, or other warm liquids during the operation.

### Syrupus citri aurantii. *Ed.*
### *Syrup of Orange peel.*

Take of
The fresh outer rind of Seville oranges, three ounces;
Boiling water, one pound and a half;
Refined sugar, three pounds.

Macerate the rind in the water for twelve hours in a covered vessel; then add to the filtered liquor the sugar, in powder, and, with a gentle heat, form a syrup.

SYRUPUS AURANTII. *Dub.*
*Syrup of Orange-peel.*

Take of
Fresh outer rind of Seville oranges, eight ounces;
Boiling water, six pints.
Macerate for twelve hours, in a close vessel; and, in the strained liquor, dissolve refined sugar to make a syrup.

SYRUPUS AURANTIORUM. *Lond.*
*Orange Syrup.*

Take of
Fresh orange rind, two ounces;
Boiling water, one pint.
Refined sugar, three pounds.
Macerate the rind in the water, in a loosely covered vessel, for twelve hours; then pour off the liquor, and add to it the sugar.

IN making this syrup, it is particularly necessary that the sugar be previously powdered, and dissolved in the infusion, with as gentle a heat as possible, to prevent the exhalation of the volatile parts of the peel. With these cautions, the syrup proves a very elegant and agreeable one, possessing a great share of the fine flavour of the orange-peel.

SYRUPUS CITRI MEDICI. *Ed.*
*Syrup of Lemons.*

Take of
Juice of lemons, filtered after the fæces have subsided, three parts;
Refined sugar, five parts.
Dissolve the sugar.

SYRUPUS LIMONIS. *Dub.*
*Syrup of Lemons.*

Take of
Strained lemon juice, one pint;
Refined sugar, two pounds.
Dissolve the sugar in the lemon juice, as directed for syrup.

SYRUPUS LIMONUM. *Lond.*
*Lemon Syrup.*

Take of
Lemon juice, strained, one pint;
Refined sugar, two pounds.
Dissolve the sugar in the lemon juice, in the same manner as directed for the formation of simple syrup.

### Syrupus mori. *Lond.*
### *Syrup of Mulberry.*

Take of
 Mulberry juice, strained, one pint;
 Refined sugar, two pounds.
Dissolve the sugar in the mulberry juice, as directed for syrup.

These are very pleasant cooling syrups; and with this intention they are occasionally used in draughts and juleps, for quenching thirst, abating heat, &c. in bilious or inflammatory distempers. They are sometimes likewise employed in gargarisms for inflammations of the mouth and tonsils.

### Syrupus aceti. *Ed.*
### *Syrup of Vinegar.*

Take of
 Vinegar, five parts;
 Refined sugar, seven parts;
Boil them, so as to form a syrup.

This is to be considered as simple syrup merely acidulated, and is by no means unpleasant. It is employed in mucilaginous mixtures, and the like; and, on account of its cheapness, it is often preferred to syrup of lemons.

### Syrupus allii. *Dub.*
### *Syrup of Garlic.*

Take of
 Garlic, sliced, one pound;
 Boiling water, two pints.
Macerate the garlic in the water, in a covered vessel, for twelve hours; then add the sugar to the strained liquor, and form a syrup.

This is a very disagreeable syrup; but when we wish to extract the virtues of garlic by a watery menstruum, it is the best means we can employ.

### Syrupus scillæ maritimæ. *Ed.*
### *Syrup of Squills.*

Take of
 Vinegar of squills, four parts;
 Refined sugar, in powder, seven parts.
Dissolve the sugar with a gentle heat, so as to form a syrup.

This syrup is used chiefly in doses of a spoonful or two, for promoting expectoration, which it does very powerfully. It is also given as an emetic to children.

### SYRUPUS COLCHICI AUTUMNALIS. *Ed.*
*Syrup of Colchicum.*

Take of

Colchicum root, fresh, cut into thin slices, one ounce;
Vinegar, sixteen ounces;
Refined sugar, twenty-six ounces.

Macerate the root in the vinegar for two days, occasionally shaking the vessel; then strain the infusion with gentle expression. To the strained infusion add the sugar, and boil a little so as to form a syrup.

THIS syrup seems to be the best preparation of the colchicum. We must take care to gather this root in the proper season; and, from errors in this particular, we are to ascribe the uncertainty in the effects of this medicine as found in the shops.

It is chiefly employed as a diuretic, and may be taken from a drachm or two to the extent of an ounce or more.

### SYRUPUS PAPAVERIS SOMNIFERI. *Ed.*
*Syrup of White Poppy.*

Take of

White poppy heads, dried, and freed from the seeds, one part;
Boiling water, fifteen parts;
Refined sugar, two parts.

Macerate the sliced heads in the water for twelve hours; boil the infusion till only one-third part of the liquor remain; then strain the decoction with strong expression. Boil the strained decoction to one-half, and strain again; lastly, add the sugar, and boil a little, so as to form a syrup.

### SYRUPUS PAPAVERIS. *Lond.*
*Syrup of Poppy.*

Take of

The heads of white poppies, dried and bruised, without the seeds, fourteen ounces;
Refined sugar, two pounds;
Boiling water, two gallons and a half.

Macerate the capsules in the water for twelve hours; boil them to one gallon in a water bath, and strongly press out the decoction. Boil this down, after being strained, to two pints, and strain it while hot; set it aside for twelve hours that the fæces may subside. Boil the liquor, poured off from the fæces, to one pint, and dissolve the sugar in it, in the manner directed for making syrup.

### Syrupus papaveris albi. *Dub.*
### *Syrup of White Poppy.*

Take of

White poppy-heads, gathered unripe, dried, and emptied of their seeds, one pound;

Boiling water, three pints.

Slice and bruise the heads, then pour on the water, and macerate for twelve hours; express the liquor, and evaporate in a moderate heat to one pint; strain through thin flannel, and set aside for six hours, to allow the fæces to subside; to the decanted liquor add the sugar, and make into a syrup.

This syrup, impregnated with the narcotic matter of the poppy heads, is given to children, in doses of two or three drachms, and to adults, of half an ounce to an ounce and upwards, for easing pain, procuring rest, and answering the other intentions of mild opiates. Particular care is requisite in its preparation, that it may be always made, as nearly as possible, of the same strength; and accordingly the colleges have been very minute in their descriptions of the process, although, as Mr Phillips remarks, the use of a water-bath in forming the decoction, as directed by the London College, is unnecessary.

### Syrupus opii. *Dub.*
### *Syrup of Opium.*

Take of

Watery extract of opium, eighteen grains;

Boiling water, eight ounces by measure.

Macerate until the opium be dissolved, then add sugar so as to make a syrup.

This syrup is an elegant substitute for the former. It is made with infinitely less trouble, and is always of an uniform strength. It contains about two grains and a half of opium in the ounce.

### Syrupus papaveris erratici. *Dub.*
### *Syrup of Red Poppy.*

Take of

The fresh petals of the red poppy, one pound;

Boiling water, twenty ounces, by measure.

Put the flowers by degrees into the boiling water. After this, the vessel being removed from the fire, and taken out of the bath, macerate for twelve hours; then press out the liquor, and set it apart, that the fæces may subside. Lastly, make it into a syrup with refined sugar.

SYRUPUS RHŒADOS. *Lond.*
*Syrup of Red Poppy.*

Take of
Fresh petals of red poppy, one pound;
Boiling water, one pint and two fluidounces;
Refined sugar, two pounds and a half.

Gradually put the petals into the water, heated in a water-bath, stirring it occasionally; then having removed the vessel from the fire, macerate for twelve hours; express the liquor, and set it aside to let the impurities settle at the bottom: then add the sugar, as directed for syrup.

THE design of putting the flowers into boiling water in a water-bath is, that they may be a little scalded, so as to shrink enough to be all immerged in the water: without this precaution they can scarce be all got in; but they are to be continued no longer over the fire than till this effect is produced, lest the liquor become too thick, and the syrup be rendered ropy.

As a medicine it is perfectly insignificant.

SYRUPUS AMOMI ZINGIBERIS. *Ed.*
*Syrup of Ginger.*

Take of
Ginger root in powder, six drachms;
Boiling water, one pound;
Refined sugar, twenty-two ounces.

Macerate the ginger in the water, in a close vessel, for twenty-four hours: strain the infusion, add the sugar, and dissolve it with a gentle heat.

SYRUPUS ZINGIBERIS. *Dub.*
*Syrup of Ginger.*

Take of
Ginger, bruised, four ounces;
Boiling water, three pints.

Macerate for twenty-four hours, and strain; then add the refined sugar, and make into a syrup.

*Lond.*

Take of
Ginger, sliced, two ounces;
Boiling water, one pint;
Refined sugar, two pounds.

Macerate the ginger in the water for four hours, and strain; then add the sugar as directed for making syrup.

This is an agreeable and moderately aromatic syrup, impregnated with the flavour and virtues of the ginger.

## Chap. XXVII.—MEDICATED HONEYS.

### Mel despumatum. *Dub. Lond. Ed.*
*Clarified Honey.*

Melt the honey in a water-bath, and remove the scum as it rises.

In this simple process, the honey is rendered so liquid by the heat of the boiling water, that the wax and other lighter impurities which it commonly contains rise to the surface, in the form of a scum, which is easily removed. At the same time, sand, or any heavy mixture of that kind, sinks to the bottom.

Honey was supposed to be peculiarly balsamic, and was therefore at one time much used in pharmacy. But as its saccharine matter is absolutely of the same nature with that of sugar, and as the extraneous matters which it always contains make it disagree with the stomachs of many individuals, the number of medicated honeys has been much diminished, and their place in some instances supplied by syrups. Medicated honeys are known to be of a proper consistence, by allowing a small quantity to cool on a plate, if, when divided by the edge of a spoon, the portions do not immediately reunite, or if the specific gravity, when hot, be 1.26, or 1.31, when cold.

### Oxymel. *Dub.*
*Oxymel.*

Take of
Honey, two pounds;
Distilled vinegar, one pint.

Boil in a glass vessel, with a gentle fire, to the consistency of a syrup, skimming it.

*Ed.*

Take of
Clarified honey, three parts;
Distilled vinegar, two parts;

Boil down in a glass vessel, with a gentle fire, to a proper thickness.

OXYMEL SIMPLEX. *Lond.*
*Simple Oxymel.*

Take of
Clarified honey, two pounds;
Acetic acid, one pint.
Boil down with a gentle fire, in a glass vessel, to a proper thickness.

THIS syrup is now rarely prepared by the apothecary, but is a favourite and useful domestic remedy in colds, and slight sore throats.

MEL SUBBORATIS SODÆ. *Ed.* MEL BORACIS. *Lond.*
*Honey of Borax.*

Take of
Subborate of soda, powdered, one drachm, (one part, *Ed.*)
Clarified honey, an ounce, (eight parts, *Ed.*)
Mix them.

THIS is an useful formula, much employed as a detergent in aphthæ and ulcers of the mouth.

OXYMEL COLCHICI. *Dub.*
*Oxymel of Meadow Saffron.*

Take of
The fresh root of meadow saffron, cut into thin slices, one ounce;
Distilled vinegar, one pint;
Clarified honey, two pounds, by weight.
Macerate the root of meadow saffron with the vinegar, in a glass vessel, with a gentle heat, for forty-eight hours. Strain the liquor, pressed out strongly from the root, and add the honey. Lastly, boil the mixture, frequently stirring it with a wooden spoon, to the thickness of a syrup.

THIS is an active preparation, but its use may be entirely superseded by the syrup of the same root.

MEL ROSÆ GALLICÆ. *Ed.*
*Honey of Red Roses.*

Take of
Red rose leaves, dried, one ounce;
Boiling water, one pound;
Clarified honey, sixteen ounces.
Macerate the petals for six hours in the water, add the honey to the filtered liquor, and boil down to a proper thickness.

MEL ROSÆ. *Dub.*
*Honey of Roses.*

Take of
The petals of red rose buds, previously dried, with the heels cut off, four ounces;
Boiling water, three pints;
Honey, five pounds.

Macerate the rose leaves in the water for six hours; then mix the honey with the strained liquor, and boil the mixture to the thickness of a syrup, removing the scum.

*Lond.*

Take of
Red rose petals, dried, four ounces;
Boiling water, three pints;
Clarified honey, five pounds.

Macerate the petals in the water for six hours; then add the honey to the filtered liquor, and boil down to a proper consistence in a water-bath.

THIS preparation is not unfrequently used as a mild, cooling detergent, particularly in gargles for ulcerations and inflammation of the mouth and tonsils. The rose-buds here used should be hastily dried, that they may the better preserve their astringency.

The Dublin college, in making this and some similar preparations, used unclarified honey, with the idea, probably, that it may be equally well clarified in the course of the preparation itself. This is no doubt true; but as we do not know what effect the clarification may have on the active substances added to the honey, we think that the use of clarified honey, as directed by the London college, is preferable.

OXYMEL SCILLÆ. *Lond. Dub.*
*Oxymel of Squills.*

Take of
Clarified honey, three pounds;
Vinegar of squills, two pints.

Boil them in a glass vessel, with a slow fire, to the thickness of a syrup, (a proper thickness, *Lond.*)

OXYMEL of squills is a useful aperient, detergent, and expectorant, and of great service in humoral asthmas, coughs, and other disorders where thick phlegm abounds. It is given in doses of two or three drachms, along with some aromatic water, as that of cinnamon, to prevent the great nausea which it would otherwise be apt to excite. In large doses it proves emetic.

OXYMEL ÆRUGINIS. *Dub.*
*Oxymel of Verdegris.*

LINIMENTUM ÆRUGINIS. *Lond.*
*Liniment of Verdegris.*

Take of
Prepared verdegris, one ounce;
Vinegar, seven ounces, by measure;
Clarified honey, fourteen ounces, by weight.
Dissolve the verdegris in the vinegar, and strain it through linen; then add the honey, and boil the whole to a proper thickness.

WHEN properly diluted with water, this preparation has been recommended in venereal ulcerations of the mouth and tonsils; although from the risk of a portion of it being swallowed, other detergent gargles are to be preferred. Externally it is applied, mixed with any digestive ointment, to destroy fungous flesh, and to excite unhealthy ulcers.

## CHAP. XXVIII.

## EMULSIONS AND MIXTURES.

IN this chapter we comprehend those mixtures in which oils, and other substances, insoluble in water, are mixed with, and suspended in watery fluids, by means of viscid substances, such as mucilage and syrups.

MISTURA AMYGDALARUM. *Lond.*
*Almond Mixture.*

Take of
Almond confection, two ounces;
Distilled water, one pint.
Triturate the confection with the water gradually added to it, until they mix; then strain.

LAC AMYGDALÆ. *Dub.*
*Almond Milk.*

Take of
Sweet almonds, blanched, an ounce and a half;

Refined sugar, half an ounce;
Water, two pints and a half.

Triturate the almonds with the sugar, adding the water by degrees, and strain.

EMULSIO AMYGDALI COMMUNIS. *Ed.*
*Almond Emulsion.*

Take of
Sweet almonds, one ounce;
Refined sugar, half an ounce;
Water, two pounds and a half.

Blanch the almonds by steeping them for a little in hot water, and peeling them; then beat them diligently with the sugar in a stone mortar, gradually pouring on the water, and strain the liquor.

EMULSIO ACACIÆ ARABICÆ. *Ed.*
*Arabic Emulsion.*

Take of
Mucilage of gum arabic, two ounces;
Almonds, one ounce;
Refined sugar, half an ounce;
Water, two pounds and a half.

Blanch the almonds, by steeping them in hot water, and peeling them; then beat them diligently in a stone mortar, first with the sugar, and then with the mucilage, gradually adding the water afterwards; lastly, strain through linen.

EMULSIO ARABICA. *Dub.*
*Arabic Emulsion.*

Take of
Gum arabic, in powder, two drachms;
Sweet almonds, blanched,
Refined sugar, each half a drachm;
Decoction of barley, one pint.

Dissolve the gum in the warm decoction, and when it is almost cold, pour it upon the almonds, previously well beaten with the sugar, and at the same time triturate them together so as to form an emulsion, and then filter.

ALL these emulsions may be considered as possessing nearly the same qualities. They are merely mechanical suspensions of oil of almonds in watery fluids, by means either of the mucilage with which it is naturally combined in the almonds by itself, or assisted by the addition of gum arabic and sugar. Therefore, on standing for some days, the oily matter separates and rises to the top, not in a pure form, but like thick cream. By heat the same decomposition is immediately effected.

Great care should be taken that the almonds have not become rancid by keeping, which not only renders the emulsion extremely unpleasant, a circumstance of great consequence in a medicine that requires to be taken in large quantities, but likewise gives it injurious qualities.

The almonds are blanched by infusing them in boiling water, and peeling them. The success of the preparation depends upon beating the almonds to a smooth pulp, and triturating them with each portion of the watery fluid, so as to form an uniform mixture before another portion be added.

These liquors are principally used for diluting and correcting acrimonious humours; particularly in heat of urine and stranguries, arising either from a natural acrimony of the juices, or from the operation of cantharides, and other irritating medicines. In these cases, they are to be drunk frequently, to the quantity of half a pint or more at a time.

### Emulsio camphoræ. *Ed.*
*Camphor Emulsion.*

Take of
- Camphor, one scruple;
- Sweet almonds,
- Refined sugar, of each, half an ounce;
- Water, a pound and a half.

Beat the blanched almonds in a stone mortar, with the camphor and sugar previously well rubbed together, gradually adding the water, and then strain.

### Mistura camphoræ. *Lond.*
*Camphor Mixture.*

Take of
- Camphor, half a drachm;
- Rectified spirit, ten minims;
- Water, one pint.

First triturate the camphor with the spirit, then with the water gradually poured upon it, and strain.

### Mistura camphorata. *Dub.*
*Camphorated Mixture.*

Take of
- Camphor, one scruple;
- Rectified spirit of wine, ten drops;
- Refined sugar, half an ounce;
- Water, one pint.

Rub the camphor first with the spirit of wine, then with the sugar; lastly, add the water, by degrees, during the trituration, and strain the mixture through linen.

Neither of these mixtures are very permanent, as the camphor separates, and swims upon the surface in the course of a few days. As extemporaneous prescriptions, they are, however, very convenient modes of exhibiting that active drug, and may be given to the extent of a table spoonful every three or four hours in typhoid fevers.

### Lac ammoniaci. *Dub.*
### *Emulsion of Gum Ammoniac.*

Take of
 Gum ammoniac, one drachm;
 Pennyroyal water, eight ounces, by measure.
Rub the gum resin with the pennyroyal water, gradually poured on, until the mixture acquire a milky appearance. It is then to be poured through linen.

### Mistura ammoniaci. *Lond.*
### *Mixture of Ammoniac.*

Take of
 Ammoniac, two drachms;
 Water, half a pint.
Triturate the ammoniac with the water, gradually added to it, until they are thoroughly mixed.

### Lac asæfœtidæ. *Dub.*
### *Emulsion of Assafœtida.*

Take of
 Assafœtida, one drachm;
 Pennyroyal water, eight ounces, by measure.
Triturate the assafœtida with the water, gradually added to it, until it form an emulsion.

### Mistura assafœtidæ. *Lond.*
### *Mixture of Assafœtida.*

Take of
 Assafœtida, two drachms;
 Water, half a pint.
Triturate the assafœtida with the water, gradually added to it, until they become thoroughly mixed.

The lac ammoniaci is employed for attenuating tough phlegm, and promoting expectoration in humoral asthmas, coughs, and obstructions of the viscera. It may be given to the quantity of two spoonfuls twice a-day.

The assafœtida emulsion answers the same purposes as assafœtida in substance, and on some occasions is a more convenient, though very disagreeable mode of exhibiting it.

### Mistura ferri composita. *Lond.*
### *Compound Mixture of Iron.*

Take of
- Myrrh in powder, one drachm;
- Subcarbonate of potass, twenty-five grains;
- Rose water, seven fluidounces and a half;
- Sulphate of iron in powder, one scruple;
- Spirit of nutmeg, half a fluidounce;
- Refined sugar, a drachm.

Triturate the myrrh with the subcarbonate of potass and the sugar; and during the trituration, add first the rose water and spirit of nutmeg, and lastly the sulphate of iron. Immediately put the mixture into a proper glass bottle, and keep it well corked.

This is Griffith's celebrated tonic myrrh mixture. The myrrh is rendered more soluble, by forming a kind of soap with the alkali; a saponaceous emulsion is next formed, by the addition of the water, which is decomposed on the addition of the sulphate of iron. The alkali combines with the sulphuric acid, while the myrrh and black oxide of iron remain suspended in the mixture. It must be carefully preserved from the action of the air, which would gradually convert the black oxide of iron into the red. It is not easy to powder the myrrh alone. It must be well dried, and powdered, in very cold weather.

### Mistura guaiaci. *Lond.*
### *Guaiac Mixture.*

Take of
- Guaiac, one drachm and a half;
- Refined sugar, two drachms;
- Mucilage of gum arabic, two fluid drachms;
- Cinnamon water, eight fluidounces.

Triturate the guaiac with the sugar, then with the mucilage, and during the trituration with these, gradually add the cinnamon water.

This is one of the best forms of exhibiting guaiac, although it is not dissolved, but only mechanically suspended in the mixture, by means of the sugar and mucilage.

### Mistura moschi. *Lond.*
### *Musk Mixture.*

Take of
- Musk,
- Gum arabic, powdered,

Refined sugar, of each one drachm;
Rose water, six fluidounces.

Rub the musk first with the sugar, then with the gum, and add the rose water by degrees.

Unless the musk be very thoroughly triturated with the sugar and gum before the addition of the water, it soon separates. An ounce, or an ounce and a half, may be taken for a dose.

### Potio carbonatis calcis. *Ed.*
### *Potion of Carbonate of Lime.*

Take of prepared carbonate of lime, one ounce;
Refined sugar, half an ounce;
Mucilage of gum arabic, two ounces.

Triturate together, and then gradually add of
Water, two pounds and a half;
Spirit of cinnamon, two ounces.

### Mistura cretæ. *Lond. Dub.*
### *Mixture of Chalk.*

Take of
Prepared chalk, half an ounce;
Refined sugar, three drachms;
Gum arabic, powdered, one ounce (half an ounce, *Lond.*);
Water, one pint.

Mix them by trituration.

This is a very elegant form of exhibiting chalk, and is an useful remedy in diseases arising from, or accompanied with, acidity in the primæ viæ. It is frequently employed in diarrhœa proceeding from that cause. The mucilage not only serves to keep the chalk uniformly diffused, but also improves its virtues. Of this medicine a pound or two may be taken in the course of a day.

### Mistura cornu usti. *Lond.* Decoctum cornu cervini. *Dub.*
### *Mixture of Burnt Horn; Decoction of Hartshorn.*

Take of
Burnt and prepared hartshorn, two ounces;
Gum arabic, in powder, one ounce (three drachms, *Dub.*);
Water, three pints.

Boil, constantly stirring, down to two pints; and strain.

Prepared hartshorn is phosphate of lime in a minute state of mechanical division. By boiling in a mucilaginous liquid, it is diffused and imperfectly suspended, but not a particle of it is dissolved. This is therefore an extremely injudicious

preparation; for phosphate of lime would be much more easily and effectually suspended by triturating it with a larger proportion of gum arabic, and adding the water gradually. But we believe that this preparation has no other action than that of a weak mucilage.

### Enema catharticum. *Dub.*
*Purging Clyster.*

Take of
Manna, one ounce.
Dissolve in ten ounces, by measure, of
Compound decoction of chamomile; then add of
Olive oil, one ounce;
Sulphate of magnesia, half an ounce.
Mix them.

### Enema fœtidum. *Dub.*
*Fetid Clyster,*

Is made by adding to the former two drachms of the tincture of assafœtida.

These are very useful extemporaneous preparations.

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## *ACETICA.*

## Chap. XXIX.—MEDICATED VINEGARS.

Infusions of vegetable substances in acetic acid are commonly called Medicated Vinegars. The action of the acid in this case may be considered as twofold.

1. It acts simply as water, in consequence of the great quantity of water which enters into its composition, and generally extracts every thing which water is capable of extracting.

2. It exerts its own peculiar action as an acid. In consequence of this it sometimes increases the solvent power of its watery portion, or dissolves substances which water alone is incapable of dissolving, and in a few instances it impedes the solution of substances which water alone would dissolve.

As acetic acid, in itself sufficiently perishable, has its tendency to decomposition commonly increased, by the solution of any vegetable matter in it, it should never be used as a

menstruum, unless where it promotes the solution of the solvend, as in extracting the acrid principle of squills, colchicum, &c. and in dissolving the volatile, and especially the empyreumatic oils, or where it coincides with the virtues of the solvend.

### ACIDUM ACETICUM AROMATICUM. *Ed.*
*Aromatic Acetic Acid.*

Take of
Rosemary tops, dried,
Sage leaves, dried, each one ounce;
Lavender flowers, dried, half an ounce;
Cloves, bruised, half a drachm;
Weak acetic acid, two pounds.

Macerate for seven days, express the liquor, and filter it through paper.

This is given as an improved preparation of the *Vinaigre des quatre voleurs*, which was supposed to be a certain prophylactic against the contagion of plague and similar diseases. It is in fact a pleasant solution of essential oils in vinegar, which will have more effect in correcting bad smells, than in preventing fever.

### ACIDUM ACETICUM SCILLITICUM. *Ed.*
*Vinegar of Squills.*

Take of
Dried squills, one ounce;
Weak acetic acid, fifteen ounces;
Stronger alcohol, an ounce and a half.

Macerate the squills in the acetic acid for seven days; then press out the liquor, to which add the alcohol; and when the fæces have subsided, pour off the clear liquor.

### ACETUM SCILLÆ. *Lond.*
*Vinegar of Squills.*

Take of
Squills, recently dried, one pound;
Acetic acid, six pints;
Proof-spirit, half a pint.

Macerate the squills with the vinegar in a covered glass vessel, with a gentle heat, for twenty-four hours; then express the liquor, and set it aside until the fæces subside. Lastly, to the decanted liquor, add the spirit.

### *Dub.*

Take of
Squills, recently dried, half a pound;

Vinegar, three pints;
Proof-spirit, four ounces.

Macerate the squills in the vinegar for four days, in a glass vessel, frequently agitating it; then express the acid; to which, poured from the fæces after they have subsided, add the spirit.

Vinegar of squills is a medicine of great antiquity. It is a very powerful stimulant; and hence it is frequently used, with great success, as a diuretic and expectorant. The dose of this medicine is from a drachm to half an ounce; where crudities abound in the first passages, it may be given at first in a larger dose, to evacuate them by vomiting. It is most conveniently exhibited along with cinnamon, or other agreeable aromatic waters, which prevent the nausea it would otherwise, even in small doses, be apt to occasion.

### Acetum colchici. *Lond.*
### *Vinegar of Meadow Saffron.*

Take of
Fresh root of meadow saffron, sliced, one ounce;
Acetic acid, one pint;
Proof-spirit, one fluidounce.

Macerate the root with the vinegar, in a corked glass bottle, for twenty-four hours; then express the liquor, and set it at rest to settle; lastly, add the spirit to the defæcated liquor.

This is substituted for the oxymel of the former edition of the London Pharmacopœia, and appears to be a more convenient form. It is said to be powerfully diuretic.

### Acidum aceticum camphoratum. *Dub.*
### *Camphorated Acetic Acid.*

Take of
Acetic acid, six ounces by measure;
Camphor, half an ounce;
Rectified spirit, a sufficient quantity.

Reduce the camphor to powder, by means of the spirit; then add the acid and dissolve.

### Acidum aceticum camphoratum. *Ed.*
### *Camphorated Acetic Acid.*

Take of
Strong acetic acid, six ounces;
Camphor, half an ounce.

Triturate the camphor with a little alcohol; add it to the acid and dissolve.

The alcohol in this preparation is used merely to facilitate

the reduction of the camphor to powder; for the strong acetic acid is capable of dissolving even a larger proportion of camphor than is directed in the above formula.

This solution is a powerful analeptic remedy. Its vapour, snuffed up the nostrils, which is the only method of using it, is one of the most pungent stimuli we possess. It is so extremely volatile and corrosive, that it is difficult to preserve, except in glass phials, with ground glass stoppers, or in small gold boxes, such as are used for Henry's aromatic spirit of vinegar, for which it is in fact an officinal substitute.

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## Chap. XXX.—TINCTURES.

*Ed.*

Tinctures ought to be made in close glass vessels, and often shaked during the preparation.

The term Tincture has often been employed in a very vague sense. It is now commonly applied to solutions, made by infusion or digestion, in alcohol, or diluted alcohol. But it is also, though perhaps incorrectly, extended to solutions in ether, etherial spirits, and spirit of ammonia.

Alcohol is capable of dissolving resins, gum-resins, extractive, tannin, sugar, volatile oils, soaps, camphor, adipocere, colouring matters, acids, alkalies, and some compound salts. Many of these, as the gum resins, soaps, extractive, tannin, sugar, and saline substances, are also soluble in water, while water is capable of dissolving substances, such as gum, gelatin, and most of the compound salts, which are insoluble in alcohol. But the insolubility of these substances in the different menstrua is not absolute, but merely relative; for a certain proportion of alcohol may be added to a solution of gum in water without decomposing it; and a solution of resin in alcohol will bear a certain admixture of water without becoming turbid. Therefore, diluted alcohol, which is a mixture of these two menstrua, sometimes extracts the virtues of heterogeneous compounds more completely than either of them separately.

Alcohol is used as a menstruum,

1. When the solvend is not soluble, or is only sparingly soluble in water.
2. When a watery solution of the solvend is extremely perishable.

3. When the use of alcohol is indicated as well as that of the solvend.

In making alcoholic tinctures, we must observe that the virtues of recent vegetable matters are very imperfectly extracted by spiritous menstrua. They must therefore be previously carefully dried, and as we cannot assist the solution by means of heat, we must facilitate it by the mechanical division of the solvend. A coarse powder often answers best, as, when too minute, it is apt to settle and agglutinate. To prevent loss, the solution is commonly made in a close vessel, and the heat applied must be very gentle, lest it be broken by the expansion of vapour.

The action of tinctures on the living system is always compounded of the action of the menstruum, and of the matters dissolved in it. Now, these actions may either coincide with, or oppose each other; and as alcohol is at all times a powerful agent, it is evident that no substance should be exhibited in the form of a tincture, whose action is different from that of alcohol, unless it be capable of operating in so small a dose, that the quantity of alcohol taken along with it is inconsiderable.

Tinctures are not liable to spoil, as it is called, but they must nevertheless be kept in well-closed phials, especially when they contain active ingredients, to prevent the evaporation of the menstruum.

They generally operate in doses so small, that they are rarely exhibited by themselves, but commonly combined with some vehicle which ought not to decompose the tincture, or at least not separate any thing from it in a palpable form.

The colleges direct all tinctures to be prepared in closed phials, and to be frequently shaken during the process.

### Tinctura acaciæ catechu. *Ed.*
*Tincture of Catechu.*

Take of

Extract of catechu, three ounces;
Cinnamon, bruised, two ounces;
Weaker alcohol, two pounds and a half.

Digest for seven days, and strain through paper.

### Tinctura catechu. *Lond. Dub.*
*Tincture of Catechu.*

Take of

Extract of catechu, three ounces;
Cinnamon, bruised, two ounces;
Proof-spirit, two pints.

Digest for seven days (macerate for fourteen, *Lond.)* and filter.

The cinnamon is a very useful addition to the catechu, not only as warming the stomach, but likewise as covering its taste.

This tincture is of service in all kinds of defluctions, catarrhs, looseness, uterine fluxes, and other disorders, where astringent medicines are indicated. Two or three tea-spoonfuls may be taken every now and then in red wine, or any other vehicle.

### Tinctura aloes socotorinæ. *Ed.*
*Tincture of Socotorine Aloes.*

Take of
- Socotorine aloes, in powder, half an ounce;
- Extract of liquorice, an ounce and a half;
- Stronger alcohol, four ounces;
- Water, one pound.

Digest for seven days, and pour off the depurated tincture.

### Tinctura aloes. *Dub.*
*Tincture of Aloes.*

Take of
- Socotorine aloes, powdered, half an ounce;
- Extract of liquorice, dissolved in eight ounces of boiling water, an ounce and a half;
- Proof-spirit, eight ounces, by measure.

Digest for seven days, then strain.

*Lond.*

Take of
- Extract of spiked aloes, in powder, half an ounce;
- Extract of liquorice, one ounce and a half;
- Water, a pint;
- Rectified spirit, four fluidounces.

Macerate in a sand bath until the extracts be dissolved, then strain.

This is one of the simplest of the aloëtic tinctures, and is one of the best formulæ for the exhibition of that useful drug in a fluid form. The liquorice is added to cover the taste of the aloes, and to assist in suspending it in the fluid. About an ounce may be taken for a dose.

### Tinctura aloes et myrrhæ. *Ed.*
*Tincture of Aloes and Myrrh.*

Take of
- Myrrh, in powder, two ounces;

Stronger alcohol, one pound and a half;
Water, half a pound.

Mix the alcohol with the water, then add the myrrh; digest for four days; and, lastly, add
Socotorine aloes, in powder, one ounce and a half;
Saffron, cut in pieces, one ounce.

Digest again for three days, and pour off the tincture from the sediment.

### TINCTURA ALOES COMPOSITA. *Lond. Dub.*
### *Compound Tincture of Aloes.*

Take of
Socotorine aloes,
Saffron, of each three ounces;
Tincture of myrrh, two pints.

Digest for seven days (macerate for a fortnight, *Lond.*), and strain.

THIS is supposed to be an improvement on the elixir proprietatis of Paracelsus. These tinctures differ considerably in strength; the latter contains one part of aloes to eight of the menstruum; the former one to sixteen, while the simple tincture already mentioned contains but one to thirty-two. In prescription these proportions must be attended to. The myrrh and saffron may add to its stimulating properties.

### TINCTURA AMOMI REPENTIS. *Ed.*
### *Tincture of Cardamom.*

Take of
Lesser cardamom seeds, bruised, four ounces;
Weaker alcohol, two pounds and a half.

Digest for seven days, and filter through paper.

### TINCTURA CARDAMOMI. *Lond. Dub.*
### *Tincture of Cardamom.*

Take of
Lesser cardamom seeds, husked and bruised, three ounces;
Proof-spirit, two pints.

Digest for seven days (macerate for fourteen days, *Lond.*), and strain.

TINCTURE of Cardamoms has been in use for a considerable time. It is a pleasant warm cordial; and may be taken, along with any proper vehicle, in doses of from a drachm to a spoonful or two.

TINCTURA CARDAMOMI COMPOSITA. *Dub.*
*Compound Tincture of Cardamom.*

Take of
Lesser cardamom seeds, husked and bruised,
Cochineal, in powder,
Caraway seeds, each, powdered, two drachms;
Cinnamon, bruised, half an ounce;
Proof-spirit, two pints.
Digest for fourteen days, and strain.

*Lond.*

Take of
Cardamom seeds,
Caraway seeds,
Cochineal, of each, powdered, two drachms;
Cinnamon-bark, bruised, half an ounce;
Raisins, stoned, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

THIS tincture is somewhat less stimulant than the compound tincture of cinnamon, which, besides a larger proportion of aromatics, contains also long pepper. The large proportion of raisins used by the London college forms only a very uneconomical and inelegant method of sweetening an aromatic tincture.

TINCTURA ARISTOLOCHIÆ SERPENTARIÆ. *Ed.*
*Tincture of Snake-Root.*

Take of
Virginian snake-root, bruised, two ounces;
Cochineal, in powder, one drachm;
Weaker alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA SERPENTARIÆ. *Lond. Dub.*
*Tincture of Snake-Root.*

Take of
Virginian snake-root, sliced and bruised, three ounces;
Proof-spirit, two pints.
Digest for seven days (macerate for fourteen, *Lond.*), and strain.

THIS tincture, which contains the whole virtues of the root, may be taken to the quantity of a spoonful or more every five or six hours; and to this extent it often operates as an useful diaphoretic.

TINCTURA AURANTII. *Lond. Dub.*
*Tincture of Orange-peel.*

Take of
Fresh orange-peel, three ounces;
Proof-spirit, two pints.
Digest for three days (macerate for fourteen days, *Lond.)*, and strain.

THIS tincture is an agreeable bitter, flavoured at the same time with the essential oil of the orange-peel.

TINCTURA BENZOINI COMPOSITA. *Ed.*
*Compound Tincture of Benzoin.*

Take of
Benzoin, in powder, three ounces;
Balsam of Tolu, two ounces;
Socotorine aloes, in powder, half an ounce;
Stronger alcohol, two pounds.
Digest for seven days, and strain through paper.

TINCTURA BENZOES COMPOSITA. *Dub.* TINCTURA BENZOINI COMPOSITA. *Lond.*
*Compound Tincture of Benzoin.*

Take of
Benzoin, three ounces;
Purified storax, two ounces;
Balsam of Tolu, one ounce;
Socotorine aloes, half an ounce;
Rectified spirit of wine, two pints.
Digest for seven days (macerate for fourteen days, *Lond.)*, and filter.

THESE preparations may be considered as simplifications of some very complicated compositions, which were celebrated under different names; such as Baume de Commandeur, Wade's balsam, Friars balsam, Jesuits drops, &c. These, in general, consisted of a confused farago of discordant substances.

TINCTURA BONPLANDIÆ TRIFOLIATÆ. *Ed.* TINCTURA ANGUSTURÆ. *Dub.*
*Tincture of Angustura.*

Take of
Angustura bark, in coarse powder, two ounces;
Proof-spirit of wine, two pints.
Digest for seven days, and filter.

ANGUSTURA bark readily gives out its active principles to

alcohol; hence the tincture is a convenient and useful preparation.

TINCTURA CAMPHORÆ. *Ed.*
*Tincture of Camphor.*

Take of
Camphor, one ounce;
Stronger alcohol, one pound.
Mix them together, that the camphor may be dissolved.

It may also be made with a double, or triple proportion of camphor.

SPIRITUS CAMPHORÆ. *Lond.*
*Spirit of Camphor.*

Take of
Camphor, four ounces;
Rectified spirit, two pints.
Mix so as to dissolve the camphor.

SPIRITUS CAMPHORATUS. *Dub.*
*Camphorated Spirit.*

Take of
Camphor, one ounce;
Rectified spirit of wine, eight ounces, by measure.
Mix so as to dissolve the camphor.

THESE solutions of camphor are only employed for external uses, against rheumatic pains, paralytic numbnesses, inflammations, for discussing tumours, and preventing gangrenes, or restraining their progress. They are too pungent to be exhibited internally, and cannot be diluted with water, without being totally decomposed.

TINCTURA CANTHARIDIS VESICATORIÆ. *Ed.*
*Tincture of Cantharides.*

Take of
Cantharides, bruised, one drachm;
Weaker alcohol, one pound.
Digest for seven days, and strain through paper.

TINCTURA CANTHARIDIS. *Dub.*
*Tincture of Spanish Flies.*

Take of
Bruised cantharides, two drachms;
Cochineal, powdered, half a drachm;
Proof-spirit, one pint and a half.
Digest for seven days, and strain.

TINCTURA LYTTÆ. *Lond.*
*Tincture of Cantharides.*

Take of
Cantharides, bruised, three drachms;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

THIS tincture contains the active principle of the cantharides, whatever it may be. It is applied externally as a stimulant and rubefacient, and is sometimes given internally, in doses of from ten to twenty drops, as a diuretic, or as a stimulant in gleets and gonorrhœa.

TINCTURA CROTONIS ELEUTHERIÆ. *Ed.* TINCTURA CASCARILLÆ. *Lond. Dub.*
*Tincture of Cascarilla.*

Take of
The bark of cascarilla, powdered, four ounces;
Proof-spirit, two pints, (two pounds and a half, *Ed.*)
Digest for seven days, (macerate for fourteen days, *Lond.*), and strain.

THE proportion of alcohol is here so large, as indeed it is in most of the tinctures of this kind, that it is merely to be considered as a concealed dram.

TINCTURA CASTOREI. *Lond. Dub.*
*Tincture of Castor.*

Take of
Russian castor, powdered, two ounces;
Proof-spirit, two pints.
Digest (macerate, *Lond.*) for seven days, and strain.

*Ed.*

Take of
Castor in powder, an ounce and a half;
Stronger alcohol, one pound.
Digest for seven days, and strain through paper.

It has been disputed, whether a weak or rectified spirit, and whether cold or warm digestion, are preferable for making this tincture; but, from experiment, it appears that castor, macerated without heat, gives out its finer and most grateful parts to either spirit, but most perfectly to the rectified; that heat enables both to extract the greatest part of its grosser and more nauseous matter; and that proof-spirit extracts this last more readily then rectified.

The tincture of castor is recommended in most kinds of nervous complaints and hysteric disorders: in the latter, it

sometimes does service, though many have complained of its proving ineffectual. The Dublin college has two tinctures of castor, which differ only in the one being made with Russian, and the other with Canadian castor. The dose is from twenty drops to forty, fifty, or more.

TINCTURA CAPSICI. *Lond. Dub.*
*Tincture of Capsicum.*

Take of
Capsicum pods, one ounce;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

THIS is a very powerful acrid stimulant. It has been recommended in gangrenous sore throats.

TINCTURA CINCHONÆ LANCIFOLIÆ. *Ed.*
*Tincture of Cinchona.*

Take of
Cinchona bark, in powder, four ounces;
Weaker alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

TINCTURA CINCHONÆ. *Dub.*
*Tincture of Cinchona.*

Take of
Cinchona bark, in coarse powder, four ounces;
Diluted alcohol, two pints.
Digest for seven days, and strain through paper.

TINCTURA CINCHONÆ. *Lond.*
*Tincture of Cinchona.*

Take of
Lance-leaved cinchona bark, in powder, seven ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

THIS tincture is certainly impregnated with the virtues of cinchona, but not to such a degree that it can be given in sufficient doses to act as cinchona, without exhibiting more alcohol than what is proper to be given as a medicine. Indeed, we are afraid that this and other bitter and tonic tinctures, as they are called, are with some only an apology for dram-drinking, and that the most certain effects they produce are slight degrees of intoxication. That of the London college is the best, as containing most bark.

TINCTURA CINCHONÆ COMPOSITA. *Lond. Dub. Ed.*
*Compound Tincture of Cinchona.*

Take of
Peruvian bark, powdered, two ounces;

Rind of Seville oranges, dried, one ounce and a half (half an ounce, *Dub.)*;
Virginian snake-root, bruised, three drachms;
Saffron, one drachm;
Cochineal, powdered, two scruples;
Proof-spirit, twenty fluidounces.

Digest (macerate, *Lond.)* for fourteen days, (seven days, *Ed.)* and strain, (through paper, *Ed.)*

This is said to be the same with the celebrated *Huxham's Tincture of Bark.*

As a corroborant and stomachic, it is given in doses of two or three drachms; but when employed for the cure of intermittents, it must be taken to a greater extent.

### Tinctura lauri cinnamomi. *Ed.*
### *Tincture of Cinnamon.*

Take of
Cinnamon, bruised, three ounces;
Weaker alcohol, two pounds and a half.

Digest for seven days, and strain through paper.

### Tinctura cinnamomi. *Lond. Dub.*
### *Tincture of Cinnamon.*

Take of
Cinnamon, bruised, three ounces (three ounces and a half, *Dub.)*;
Proof spirit of wine, two pints.

Digest for seven days, (macerate for fourteen days, *Lond.)*, and strain.

The tincture of cinnamon possesses the astringent virtues of the cinnamon, as well as its aromatic cordial ones; and in this respect it differs from the spirit prepared by distillation.

### Tinctura cinnamomi composita. *Ed.*
### *Compound Tincture of Cinnamon.*

Take of
Cinnamon bark, bruised,
Lesser cardamom seeds, bruised, each one ounce;
Long pepper, in powder, two drachms;
Weaker alcohol, two pounds and a half.

Digest for seven days, and filter through paper.

### *Lond. Dub.*

Take of
Cinnamon, bruised, six drachms;
Lesser cardamom seeds, husked and bruised, three drachms;

Long pepper, in powder,
Ginger, sliced, of each two drachms;
Proof-spirit, two pints.

Mix and digest for seven days (macerate for fourteen, *Lond.)*; then strain.

In their formula, the Dublin and London colleges diminish the quantity of cardamom seeds, and substitute for it a proportion of ginger. This makes no alteration in the virtues of the preparation, which is a very warm aromatic, too hot to be given without dilution. A tea-spoonful or two may be taken in wine, or any other convenient vehicle, in languors, weakness of the stomach, flatulencies, and other similar complaints; and in these cases it is often employed with advantage.

### Tinctura colombæ. *Ed.* Tinctura columbo. *Dub.*
*Tincture of Colomba.*

Take of
Colomba root, powdered, two ounces;
Proof-spirit of wine, two pints.

Digest for seven days, and filter through paper.

### Tinctura calumbæ. *Lond.*
*Tincture of Colomba.*

Take of
Colomba root, sliced, two ounces and a half;
Proof-spirit, two pints.

Macerate for fourteen days, and strain.

This is a very good stomachic tincture, which may be used when the stomach will not bear the colomba in powder.

### Tinctura conii maculati.
*Tincture of Hemlock.*

Take of
Hemlock leaves, dried, two ounces;
Lesser cardamom seeds, bruised, half an ounce;
Weaker alcohol, sixteen ounces.

Digest for seven days, and filter through paper.

This is now first introduced as another anodyne tincture. There is some advantage in having a variety of them, as the idiosyncrasies in respect to them are often very singular. We have no experience of its powers.

### Tinctura convolvuli jalapæ. *Ed.*
*Tincture of Jalap.*

Take of
Jalap, in powder, three ounces;

Weaker alcohol, fifteen ounces.
Digest for seven days, and strain the tincture through paper.

TINCTURA JALAPÆ. *Lond.*
*Tincture of Jalap.*

Take of
Jalap, in powder, eight ounces;
Proof-spirit, two pints.
Macerate for fourteen days, with a gentle heat, and filter.

*Dub.*

Take of
Jalap in coarse powder, five ounces;
Proof-spirit, two pints.
Digest for seven days, and filter.

ALCOHOL was formerly ordered for the preparation of this tincture; but diluted alcohol is a preferable menstruum, as it dissolves the active constituents of the jalap, as well as pure alcohol, and is less stimulating. The Dublin is the weakest, the London the strongest.

TINCTURA CROCI SATIVI. *Ed.* TINCTURA CROCI. *Dub.*
*Tincture of Saffron.*

Take of
Saffron, cut in shreds, one ounce;
Diluted alcohol, fifteen ounces (one pint, *Dub*).
Digest for seven days, and strain through paper.

THE proof-spirit is a very proper menstruum for extracting the medical virtues of the saffron, and affords a convenient mode of exhibiting that drug.

TINCTURA DIGITALIS PURPUREÆ. *Ed.*
*Tincture of Foxglove.*

Take of
The dried leaves of foxglove, one ounce;
Weaker alcohol, eight ounces.
Digest for seven days, and strain through paper.

TINCTURA DIGITALIS. *Dub.*
*Tincture of Foxglove.*

Take of
The leaves of foxglove, (rejecting the larger ones,) dried and in coarse powder, two ounces;
Proof-spirit, one pint.
Digest for seven days, and filter.

*Lond.*

Take of

Leaves of foxglove, dried, four ounces;

Proof-spirit, two pints.

Macerate for fourteen days, and filter.

THIS tincture is a very powerful medicine, and contains the virtues of the foxglove in a very manageable form. It has been chiefly used to diminish the force of the circulation of the blood in hæmoptysis, and often with remarkable success. It has been also said to cure incipient phthisis pulmonalis; but subsequent experience has not confirmed the first trials. Like every other form in which foxglove is given, it should be administered in very small doses at first, such as from ten to twenty drops, and cautiously increased.

TINCTURA FERULÆ ASSÆ FŒTIDÆ. *Ed.*
*Tincture of Assafœtida.*

Take of

Assafœtida, four ounces;

Stronger alcohol, two pounds and a half.

Digest for seven days, and strain through paper.

TINCTURA ASSAFŒTIDÆ. *Lond.*
*Tincture of Assafœtida.*

Take of

Assafœtida, four ounces;

Rectified spirit, two pints.

Macerate for a fortnight, and filter.

*Dub.*

Take of

Assafœtida, four ounces;

Rectified spirit of wine, two pints;

Water, eight ounces by measure.

Add the spirit to the assafœtida, triturated with the water, and digest for seven days; then strain.

THIS tincture possesses the virtues of the assafœtida, and may be given in doses of from ten drops to fifty or sixty.

TINCTURA GALBANI. *Dub.*
*Tincture of Galbanum.*

Take of

Galbanum, cut into small pieces, two ounces;

Proof-spirit of wine, two pints.

Digest with a gentle heat for seven days, and strain.

THIS tincture, though not so powerful, is less nauseous

than that of assafœtida, and therefore in some cases may be preferable.

TINCTURA GALLARUM. *Dub. Ed.*
*Tincture of Galls.*

Take of
Galls, in powder, four ounces, (two ounces, *Ed.*)
Proof-spirit, two pints, (sixteen ounces, *Ed.*)
Mix; digest for seven days, and filter.

THIS tincture was for the first time introduced into practice by the Dublin college, and it is, I have no doubt, the most powerful of all the astringent tinctures.

TINCTURA GENTIANÆ COMPOSITA. *Ed.*
*Compound Tincture of Gentian.*

Take of
Gentian root, sliced and bruised, two ounces;
Seville orange peel, dried and bruised, one ounce;
Canella alba, bruised, half an ounce;
Cochineal, in powder, half a drachm;
Weaker alcohol, two pounds and a half.
Macerate for seven days, and strain through paper.

*Dub.*

Take of
Gentian root, sliced and bruised, two ounces;
Dried rind of Seville oranges, one ounce;
Lesser cardamom seeds, husked and bruised, half an ounce;
Proof-spirit of wine, two pints.
Digest for seven days and strain.

*Lond.*

Take of
Gentian root sliced, two ounces;
Orange peel dried, one ounce;
Cardamom seeds bruised, half an ounce;
Proof-spirit, two pints.
Macerate for fourteen days, with a gentle heat, and strain.

THESE are very elegant spiritous bitters. As the preparations are designed for keeping, lemon-peel, an excellent ingredient in the watery bitter infusions, has, on account of the perishableness of its flavour, no place in these.

TINCTURA GUAIACI OFFICINALIS. *Ed.*
*Tincture of Guaiac.*

Take of
Guaiac resin, in powder, six ounces;

Stronger alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA GUAIACI. *Dub.*
*Tincture of Guaiac.*

Take of
Guaiac, four ounces;
Rectified spirit of wine, two pints.
Digest for seven days, and filter.

*Lond.*

Take of
Guaiac, in powder, half a pound;
Rectified spirit, two pints.
Macerate for fourteen days, and filter.

WHAT is called gum guaiac is in fact a resin, and perfectly soluble in alcohol. This solution is a powerful stimulating sudorific, and may be given in doses of about half an ounce, in rheumatic and arthritic cases. It was once supposed to be a specific against the gout.

TINCTURA HELLEBORI NIGRI. *Dub.*
*Tincture of Black Hellebore.*

Take of
Black hellebore root, in coarse powder, four ounces;
Cochineal, powdered, two scruples;
Proof-spirit of wine, two pints.
Digest for seven days, and strain.

*Ed.*

Take of
Black hellebore root, bruised, two ounces;
Cochineal, in powder, fifteen grains;
Weaker alcohol, fifteen ounces.
Digest for seven days, and filter through paper.

*Lond.*

Take of
Black hellebore root, sliced, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

THIS is perhaps the best preparation of hellebore, when designed for an alterative, the menstruum here employed extracting the whole of its virtues. It has been found particularly serviceable in uterine obstructions. In sanguine constitutions, where chalybeates are hurtful, it has been said that it seldom fails of exciting the menstrual evacuations, and re-

moving the bad effects of their suppression. A tea-spoonful of the tincture may be taken twice a-day in warm water, or any other convenient vehicle.

TINCTURA HUMULI LUPULI, *Ed.* TINCTURA HUMULI. *Lond.*
*Tincture of Hops.*

Take of
Hops, five ounces;
Proof-spirit, two pints, (two pounds and a half, *Ed.)*
Macerate for fourteen days, (seven days, *Ed.)*, and filter.

OPIUM in every form disagrees so completely with some people, as to render its exhibition to them improper. In these cases, we must have recourse to other narcotics, and of them the hop is one of the safest and most agreeable. Its comparative strength is not yet well ascertained, nor even the best form of exhibiting it. It is difficultly pulverizable, and in its natural form it is so extremely light and bulky, as to absorb and retain a great deal of the spirit employed to extract a tincture from it, even when subjected to much compression.

TINCTURA HYOSCIAMI NIGRI. *Ed.*
*Tincture of Henbane.*

Take of
The leaves of henbane, dried, one ounce;
Weaker alcohol, eight ounces
Digest for seven days, and strain through paper.

TINCTURA HYOSCIAMI. *Dub.*
*Tincture of Henbane.*

Take of
Henbane leaves, dried, and in coarse powder, two ounces and a quarter;
Proof-spirit, one pint.
Macerate for fourteen days, and strain.

*Lond.*

Take of
Henbane leaves, dried, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

THIS tincture, now come into very general use, is a valuable anodyne, and in many cases may be substituted with advantage for the tincture of opium, especially where the latter produces obstinate constipation, or, instead of its usual

soporific and sedative effects, causes uneasiness, restlessness, and universal irritation.

An anonymous correspondent observes, that it is useful in recent coughs, in doses to an adult of not less than thirty drops, with ten drops of laudanum, which is equal to thirty drops of the latter. Tincture of henbane alone sometimes purges; when this is an inconvenience, it is corrected by the addition of a few drops of laudanum.

### Tinctura kino. *Ed.*
*Tincture of Kino.*

Take of
  Kino, in powder, two ounces;
  Weaker alcohol, a pound and a half.
Digest for seven days, and strain through paper.

*Dub.*

Take of
  Kino, in powder, three ounces;
  Proof-spirit, a pint and a half.
Digest for seven days, and filter.

*Lond.*

Take of
  Kino, in powder, three ounces;
  Proof-spirit, two pints.
Macerate for fourteen days, and filter.

I have already stated my reasons for believing kino to be a species of tannin. This is certainly a very astringent tincture, and will be found an excellent medicine in obstinate diarrhœas, and in lienteria.

### Spiritus lavandulæ compositus. *Ed.*
*Compound Spirit of Lavender.*

Take of
  Spirit of lavender, three pounds;
  Spirit of rosemary, one pound;
  Cinnamon bark, bruised, one ounce;
  Cloves, bruised, two drachms;
  Nutmeg, bruised, half an ounce;
  Red saunders wood, in shavings, three drachms.
Macerate for seven days, and filter.

### Spiritus lavandulæ compositus. *Lond. Dub.*
*Compound Spirit of Lavender.*

Take of
  Spirit of lavender, three pints;

Spirit of rosemary, one pint,
Cinnamon, bruised,
Nutmegs, bruised, of each half an ounce;
(Cloves, two drachms, *Dub.*)
Red saunders wood, sliced, one ounce.

Digest for ten days, (macerate for fourteen days, *Lond.*), and strain.

These preparations do not differ materially. They are grateful cordials, of which from ten to a hundred drops may be conveniently taken, dropt upon sugar. It does not appear very clearly whether they should be considered as spirits or tinctures; for although the spirit of lavender be the predominant ingredient, yet the mode of preparation is that of a tincture, and the spirit as a menstruum dissolves astringent, colouring, and other substances, which would not rise with it in distillation.

### Tinctura moschi. *Dub.*
*Tincture of Musk.*

Take of
Musk, in powder, two drachms;
Rectified spirit of wine, one pint.

Digest for seven days, and strain.

Rectified spirit is the most complete menstruum for musk; but in this form it is often impossible to give a sufficient quantity of the musk.

### Tinctura myrrhæ. *Ed.*
*Tincture of Myrrh.*

Take of
Myrrh, in powder, three ounces;
Stronger alcohol, twenty ounces;
Water, ten ounces.

Digest for seven days, and strain through paper.

*Lond.*

Take of
Myrrh, bruised, four ounces;
Rectified spirit, two pints;
Water, one pint.

Macerate for fourteen days, and strain.

*Dub.*

Take of
Myrrh, bruised, three ounces;
Proof-spirit of wine, a pint and a half;
Rectified spirit of wine, half a pint.

Digest for seven days, and filter.

Tincture of myrrh is recommended internally as a cardiac, for removing obstructions, particularly those of the uterine vessels, and for resisting putrefaction. The dose is from fifteen drops to forty or more. The medicine may perhaps be given in these cases to advantage; though, with us, it is more commonly used externally, for cleansing foul ulcers, and promoting the exfoliation of carious bones.

Tinctura opii, sive thebaica; vulgo Laudanum liquidum. *Ed.*

*Tincture of Opium,* or *Thebaic Tincture,* commonly called *Liquid Laudanum.*

Take of
  Opium, two ounces;
  Weaker alcohol, two pounds.
Digest for seven days, and filter through paper.

*Dub.*

Take of
  Hard purified opium, powdered, ten drachms;
  Proof-spirit of wine, one pint.
Digest for seven days, and strain.

*Lond.*

Take of
  Hard opium, powdered, two ounces and a half;
  Proof-spirit, two pints.
Macerate for fourteen days, and strain.

As these tinctures, on evaporation, furnish the same quantity of extract, they are believed to be of nearly equal strength; but it is to be regretted that they are not so well adapted for keeping as could be wished: after some time, a part of the opium is gradually deposited from both, and consequently the tinctures become weaker: the part which thus separates amounts sometimes, it is said, to near one-fourth of the quantity of opium at first dissolved. Mr Phillips found, that when alcohol of sp. gr. 0.930 was employed with select crude opium, the tincture acquired sp. gr. 0.952, and contained 26 grains of opium *per* fluidounce; but when purified opium was used, the sp. gr. of the tincture was 0.958, and the quantity of opium in the fluidounce 36 grains; of the crude opium one grain in 3.5 remained undissolved, and of the purified only one in twenty-five; while in the tincture made with the former, one grain of opium was contained in 18.3 minims, and in that with the latter in 13.3, so that from calculation the strength of the tincture made with purified opium is to that made with crude opium as three to two nearly. But I must here ob-

serve, that calculation cannot be altogether relied upon in this case, because, although purified opium contains more soluble matter than crude opium, its narcotic powers are diminished by the preparation it has undergone.

### Tinctura opii camphorata, vulgo Elixir paregoricum anglorum. *Ed.*

*Camphorated Tincture of Opium*, or *English Paregoric Elixir.*

Take of
  Camphor, two scruples;
  Benzoic acid,
  Opium, of each a drachm;
  Weaker alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

### Tinctura opii camphorata, sive Elixir paregoricum. *Dub.*

*Camphorated Tincture of Opium. Paregoric Elixir.*

Take of
  Camphor, two scruples;
  Hard purified opium, in powder,
  Benzoic acid, of each one drachm;
  Essential oil of aniseed, one drachm;
  Proof-spirit of wine, two pints.
Digest for seven days, and strain.

### Tinctura camphoræ composita. *Lond.*

*Compound Tincture of Camphor.*

Take of
  Camphor, two scruples;
  Hard opium, in powder,
  Benzoic acid, of each one drachm;
  Proof-spirit, two pints.
Macerate for fourteen days, and filter.

In this formula, the virtues of the opium and camphor are combined. It gets an agreeable flavour from the acid of benzoin and essential oil. The latter also renders it more stimulating; but whether it derives any salutary virtues from the former, we do not know. It was originally prescribed under the title of Elixir Asthmaticum, which it does not ill deserve. It contributes to allay the tickling which provokes frequent coughing; and at the same time it is supposed to open the breast, and give greater liberty of breathing. It is given to children against the chincough, &c. in doses of from five drops to twenty; to adults, from twenty to an hundred. Half an ounce, by measure, contains about a grain of opium.

TINCTURA QUASSIÆ EXCELSÆ, *Ed.* TINCTURA QUASSIÆ. *Dub.*
*Tincture of Quassia.*

Take of
Shavings of quassia, one ounce;
Proof-spirit, two pints, (two pounds and a half, *Ed.*)
Digest for seven days, and filter.

As the Dublin college first introduced into their Pharmacopœia the most powerful of all astringent tinctures, in the present instance they also first directed a tincture to be prepared from the purest and most intense of all bitters, and in both instances they have been followed by Edinburgh

TINCTURA RHEI. *Ed.*
*Tincture of Rhubarb.*

Take of
Russian rhubarb, sliced, three ounces;
Lesser cardamom seeds, bruised, half an ounce;
Weaker alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA RHABARBARI. *Dub.*
*Tincture of Rhubarb.*

Take of
Rhubarb, cut into pieces, two ounces;
Lesser cardamom seeds, bruised, half an ounce;
Liquorice root, bruised, half an ounce;
Saffron, two drachms;
Proof-spirit of wine, two pints.
Digest for seven days, and strain.

TINCTURA RHEI. *Lond.*
*Tincture of Rhubarb.*

Take of
Rhubarb, sliced, two ounces;
Lesser cardamom seeds, bruised, half an ounce;
Saffron, two drachms;
Proof-spirit, two pints.
Macerate for fourteen days with a gentle heat, and filter.

TINCTURA RHEI COMPOSITA. *Lond.*
*Compound Tincture of Rhubarb.*

Take of
Rhubarb, sliced, two ounces;
Liquorice root, bruised, half an ounce;
Ginger sliced,
Saffron, each two drachms;

Proof-spirit, one pint;
Water, twelve fluidounces.
Macerate for fourteen days with a gentle heat, and strain.

TINCTURA RHEI ET ALOES. *Ed.*
*Tincture of Rhubarb and Aloes.*

Take of
Russian rhubarb, sliced, ten drachms;
Socotorine aloes, in powder, six drachms;
Lesser cardamom seeds, bruised, half an ounce;
Weaker alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA RHEI ET GENTIANÆ. *Ed.*
*Tincture of Rhubarb with Gentian.*

Take of
Russian rhubarb, sliced, two ounces;
Gentian root, sliced, half an ounce;
Weaker alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

ALL the foregoing tinctures of rhubarb are designed as stomachics and corroborants, as well as purgatives: spiritous liquors extract freely those parts of the rhubarb in which the two first qualities reside, and the additional ingredients considerably promote their efficacy. In weakness of the stomach, indigestion, laxity of the intestines, diarrhœas, colic, and other similar complaints, these medicines are frequently of great service.

TINCTURA SAPONIS CAMPHORATA, vulgo LINIMENTUM SAPONACEUM. *Ed.*
*Camphorated Tincture of Soap*, formerly *Saponaceous Liniment.*

Take of
Hard soap, in shavings, four ounces;
Camphor, two ounces;
Volatile oil of rosemary, half an ounce;
Stronger alcohol, two pounds.
Digest the soap in the alcohol for three days; then add to the filtered liquor the camphor and the oil, shaking them well together.

LINIMENTUM SAPONIS COMPOSITUM. *Lond.*
*Compound Soap Liniment.*

Take of
Hard soap, three ounces;
Camphor, one ounce;
Spirit of rosemary, one pint.

Dissolve the camphor in the spirit; then add the soap, and macerate in a sand-bath until it be dissolved.

### LINIMENTUM SAPONIS. *Dub.*
*Soap Liniment.*

Take of
Soap, three ounces;
Camphor, one ounce;
Spirit of rosemary, one pint.
Digest the soap in the spirit of rosemary until it be dissolved, then add the camphor.

### TINCTURA SAPONIS ET OPII; vulgo LINIMENTUM ANODYNUM. *Ed.*
*Tincture of Soap with Opium,* commonly called *Anodyne Liniment.*

Take of
Hard soap, shaved, four ounces;
Opium, one ounce;
Camphor, two ounces;
Volatile oil of rosemary, half an ounce;
Stronger alcohol, two pounds.
Digest the soap and opium in the alcohol for three days; then add to the filtered liquor the camphor and oil, and shake them well.

THESE tinctures are only used externally, and possess great efficacy in removing local pains, when rubbed on the affected part. The London and Dublin colleges have omitted the anodyne liniment, probably as it may be easily prepared extemporaneously, by mixing an equivalent proportion of laudanum with soap liniment.

### TINCTURA SCILLÆ MARITIMÆ. *Ed.*
*Tincture of Squills.*

Take of
Fresh dried squills, two ounces;
Weaker alcohol, sixteen ounces.
Digest for seven days, and filter through paper.

### TINCTURA SCILLÆ. *Dub.*
*Tincture of Squills.*

Take of
Squills, fresh dried, four ounces;
Proof-spirit of wine, two pints.
Digest for seven days; then set it aside, and when the fæces have subsided, pour off the pure liquor.

*Lond.*

Take of

Squills, fresh dried, four ounces;
Proof-spirit, two pints.

Macerate for fourteen days and strain.

The active principle of squills is soluble in alcohol, and the tincture is a useful remedy in doses of ten drops or more three times a-day.

### Tinctura sennæ composita. *Ed.*
*Compound Tincture of Senna.*

Take of

Senna leaves, two ounces;
Jalap root, bruised, one ounce;
Coriander seeds, bruised, half an ounce;
Weaker alcohol, three pounds and a half.

Digest for seven days, and to the tincture, filtered through paper, add,

Double refined sugar, four ounces.

### Tinctura sennæ. *Dub.*
*Tincture of Senna.*

Take of

Senna leaves, one pound;
Caraway seeds, bruised, one ounce and a half;
Lesser cardamom seeds, husked and bruised, half an ounce;
Proof-spirit, one gallon.

Digest for fourteen days, and strain.

*Lond.*

Take of

Senna leaves, three ounces;
Caraway seeds, bruised, three drachms;
Cardamom seeds, bruised, one drachm;
Raisins, stoned, four ounces;
Proof-spirit, two pints.

Macerate for fourteen days, with a gentle heat, and filter.

These tinctures are useful carminatives and cathartics, especially to those who have accustomed themselves to the use of spiritous liquors; they often relieve flatulent complaints and colics, where the common cordials have little effect; the dose is from one to two ounces.

### Tinctura toluiferi balsami. *Ed.*
*Tincture of the Balsam of Tolu.*

Take of

Balsam of Tolu, an ounce and a half;
Stronger alcohol, one pound.

Digest until the balsam be dissolved; and strain the tincture through paper.

TINCTURA BALSAMI TOLUTANI. *Dub.*
*Tincture of Balsam of Tolu.*

Take of
Balsam of Tolu, one ounce;
Rectified spirit, one pint.
Digest until the balsam be dissolved, and filter.

THIS solution of balsam of Tolu possesses all the virtues of the balsam itself. It may be taken internally, with the several intentions for which that balsam is proper, to the quantity of a tea-spoonful or two, in any convenient vehicle. Mixed with simple syrup, it forms an elegant balsamic syrup.

TINCTURA VALERIANÆ. *Lond. Dub.*
*Tincture of Valerian.*

Take of
The root of wild valerian, in coarse powder, four ounces;
Proof-spirit, two pints.
Digest for seven days, (macerate for fourteen, *Lond.*) and strain.

THIS tincture has a deep colour, and is strongly impregnated with the valerian; though it has not been found to answer so well in the cure of epileptic disorders as the root in substance, exhibited in the form of powder or bolus. The dose of the tincture is from half a spoonful to a spoonful or more, two or three times a-day.

TINCTURA VERATRI ALBI. *Ed.*
*Tincture of White Hellebore.*

Take of
White hellebore root, bruised, four ounces;
Diluted alcohol, sixteen ounces.
Digest for seven days, and filter the tincture through paper.

THIS tincture is sometimes used for assisting cathartics, &c. and as an emetic in apoplectic and maniacal disorders. It may likewise be so managed, as to prove a powerful alterative and deobstruent in cases where milder remedies have little effect. But a great deal of caution is requisite in its use; the dose, at first, ought to be only a few drops; if considerable, it proves violently emetic or cathartic.

TINCTURA ZINGIBERIS. *Lond. Dub.*
*Tincture of Ginger.*

Take of
Ginger sliced, (in coarse powder, *Dub.*), two ounces;

Proof-spirit, two pints.

Digest in a gentle heat for seven days, (macerate fourteen, *Lond.*) and strain.

TINCTURA AMOMI ZINGIBERIS. *Ed.*
*Tincture of Ginger.*

Take of
Ginger, bruised, two ounces;
Weaker alcohol, two pounds and a half.

Digest for seven days, and filter through paper.

THIS tincture is cordial and stimulant, and is only employed as a corrigent to purgative draughts.

## CHAP. XXXI.

## TINCTURES MADE WITH ETHEREAL SPIRITS.

WE have classed these tinctures by themselves, because they are more strongly characterised by the nature of the menstruum than of the substances dissolved in it. Indeed, the ethereal spirits are used in these instances, not to dissolve substances which would resist the action of alcohol and water, but for the sake of their own direct action on the system.

TINCTURA ALOES ÆTHEREA. *Ed.*
*Ethereal Tincture of Aloes.*

Take of
Socotorine aloes,
Myrrh, of each, in powder, one ounce and a half;
Saffron, sliced, one ounce;
Sulphuric ether with alcohol, one pound.

Digest the myrrh with the ether for four days; then add the saffron and aloes.

Digest again for four days, and, when the fæces have subsided, pour off the tincture.

THIS tincture agrees generally in its effects with the other tinctures of aloes, the only difference arising from the more penetrating and stimulating nature of the menstruum itself.

Æther sulphuricus cum alcohole aromaticus. *Ed.*
*Aromatic Sulphuric Ether with Alcohol.*

Take of
Cinnamon bark, bruised,
Lesser cardamom seeds, bruised, of each an ounce;
Long pepper, in powder, two drachms;
Sulphuric ether with alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

This is designed for persons whose stomachs are too weak to bear the following acid tincture: to the taste it is gratefully aromatic, without any perceptible acidity.

Acidum sulphuricum aromaticum. *Ed.*
*Aromatic Sulphuric Acid.*

Take of
Alcohol, two pounds;
Sulphuric acid, six ounces.
Drop the acid gradually into the alcohol. Digest the mixture with a very gentle heat, in a close vessel, for three days, and then add, of
Cinnamon bark, bruised, one ounce and a half;
Ginger root, bruised, one ounce.
Digest again, in a close vessel, for six days, and then filter the tincture through paper placed in a glass funnel.

Although the name given to this preparation by the colleges does not sanction its arrangement with the ethereal tinctures, yet I have ventured to place it here, from the belief that the alcohol is completely or partially changed, by the digestion with the acid, into an ethereal spirit; and that the principal difference between this and the preceding tincture consists in the presence of the acid, which, however, is not to be considered as the menstruum by which the tincture is formed, but as an acid mixed with the ethereal tincture.

*Medical use.*—This is a valuable medicine in weakness and relaxation of the stomach, and decay of constitution, particularly in those which proceed from irregularities, which are accompanied with slow febrile symptoms, or which follow the suppression of intermittents. It frequently succeeds, after bitters and aromatics by themselves have availed nothing; and indeed great part of its virtues depend on the sulphuric acid; which, barely diluted with water, has, in those cases where the stomach could bear the acidity, produced happy effects.

It is very usefully conjoined with cinchona, and other tonic barks, both as covering their disagreeable taste, and as coinciding with them in virtue. It may be given in doses of from ten to thirty drops, or more, several times a-day.

## Chap. XXXII.

## AMMONIATED or VOLATILE TINCTURES.

Ammonia, like ether, is so powerful an agent on the living system, that we think it gives a peculiar character to the compositions into which it enters. They are all highly stimulating and pungent, and apt to excite diaphoresis. As ammonia exerts considerable and peculiar powers as a solvent, these tinctures must never be combined in prescription with any thing acid, which would not only neutralize the ammonia, and destroy its peculiar action on the living system, but would precipitate whatever was dissolved by its agency. In prescribing these ammoniated tinctures, the practitioner must attend to the very great increase of strength in the ammoniated alcohol of the London College, being not less, according to Mr Phillips, than as five to one.

### Linimentum camphoræ compositum. *Lond.*
*Compound Camphor Liniment.*

Take of
- Camphor, two ounces;
- Water of ammonia, six fluidounces;
- Spirit of lavender, a pint.

Mix the water of ammonia with the spirit; and distil from a glass retort, with a slow fire, one pint. Then dissolve the camphor in the distilled liquor.

This is more pungent and penetrating than the solution of camphor in alcohol. Is the distillation necessary to get an ammoniated alcohol without water? Probably. Mr Phillips, dreading the extreme causticity of the *Aqua ammoniæ* of the present Pharmacopœia, proposes the substitution of an equivalent quantity of subcarbonate of ammonia.

### Tinctura castorei composita. *Ed.*
*Compound Tincture of Castor.*

Take of
- Castor, in powder, one ounce;
- Assafœtida, half an ounce;
- Ammoniated alcohol, one pound.

Digest for seven days, and filter through paper.

This composition is a medicine of real efficacy, particularly in hysterical disorders, and the several symptoms which accompany them. The spirit here used is an excellent menstruum, both for the castor and the assafœtida, and greatly adds to their virtues.

### Tinctura cinchonæ ammoniata. *Lond.*
*Ammoniated Tincture of Cinchona.*

Take of
  Lance-leaved cinchona bark in powder, four ounces;
  Aromatic spirit of ammonia, two pints.
Macerate for ten days, and strain.

This is now first introduced by the London college. It does not appear to be a very judicious preparation, or at least it can only act as a modification of ammoniated alcohol, for the cinchona cannot be supposed to contribute at all to its effects.

### Tinctura guaiaci ammoniata. *Ed. Dub.*
*Ammoniated Tincture of Guaiac.*

Take of
  Resin of guaiac, in powder, four ounces;
  Ammoniated alcohol, one pound and a half (one pint and a half, *Dub.)*
Digest for seven days, and filter through paper.

*Lond.*

Take of
  Guaiac, in powder, four ounces;
  Aromatic spirit of ammonia, one pint and a half.
Macerate for fourteen days, and filter.

These are very elegant and efficacious tinctures; the ammoniated spirit readily dissolving the resin, and, at the same time, promoting its medicinal virtue. In rheumatic cases, a tea, or even table, spoonful, taken every morning and evening, in any convenient vehicle, particularly in milk, has proved of singular service.

### Tinctura opii ammoniata; olim Elixir paregoricum. *Ed.*
*Ammoniated Tincture of Opium*, formerly *Paregoric Elixir.*

Take of
  Opium,
  Saffron, sliced,
  Benzoic acid, of each three drachms;
  Volatile oil of aniseed, half a drachm;
  Ammoniated alcohol, sixteen ounces.
Digest for seven days, and filter through paper.

This is a preparation of considerable efficacy in many spasmodic diseases, as chincough, &c. the ammonia removing the spasm immediately, while the opium tends to prevent its return. Each drachm contains about a grain of opium.

### Tinctura valerianæ ammoniata. *Lond.*
*Ammoniated Tincture of Valerian.*

Take of
 Valerian root, four ounces;
 Aromatic spirit of ammonia, two pints.
Macerate for fourteen days, and strain.

*Dub. Ed.*

Take of
 Valerian root, in powder, two ounces, (four ounces, *Ed.*)
 Spirit of ammonia, one pint, (two pounds and a half, *Ed.*)
Digest for seven days, and filter.

The spirit of ammonia, both simple and compound, is here an excellent menstruum, and, at the same time, considerably promotes the virtues of the valerian, which, in some cases, wants assistance of this kind. The dose may be a tea-spoonful or two.

### Tinctura assæfœtidæ ammoniata. *Ed.*
*Ammoniated Tincture of Assafœtida.*

Take of
 Ammoniated alcohol, eight ounces;
 Assa foetida, half an ounce.
Digest in a close vessel for twelve hours; then distil off, with the heat of boiling water, eight ounces.

### Spiritus ammoniæ fœtidus. *Lond.*
*Fœtid Spirit of Ammonia.*

Take of
 Spirit of ammonia, two pints;
 Assa fœtida, two ounces.
Macerate for twelve hours; and distil, with a slow fire into a cooled receiver, one pint and a half.

*Dub.*

Take of
 Spirit of ammonia, two pints;
 Assa fœtida, an ounce and a quarter.
Digest, in a close vessel, for three days, with occasional agitation. Pour off the clear liquor, and distil a pint and a half.

Volatile spirits, impregnated with different fœtids, have been usually kept in the shops as anti-hysterics: the ingredient here chosen is the best calculated of any for general use. The spirit is pale when newly distilled, but acquires a considerable tinge by keeping.

### Tinctura aromatica ammoniata. *Ed.*
*Aromatic Ammoniated Tincture.*

Take of
 Ammoniated alcohol, eight ounces;
 Volatile oil of rosemary, one drachm and a half;
 Volatile oil of lemon-peel, one drachm.
Mix them, that the oils may be dissolved.

### Spiritus ammoniæ aromaticus. *Dub.*
*Aromatic Spirit of Ammonia.*

Take of
 Spirit of ammonia, two pints;
 Essential oil of lemon, two drachms;
 Nutmegs, bruised, half an ounce.
Digest in a close vessel, for three days, with occasional agitation, and draw off a pint and a half.

*Lond.*

Take of
 Cinnamon bark, bruised,
 Cloves, bruised, of each two drachms;
 Lemon-peel, four ounces;
 Subcarbonate of potass, half a pound;
 Muriate of ammonia, five ounces;
 Rectified spirit, four pints;
 Water, one gallon.
Mix, and draw off six pints.

Medicines of this kind may be prepared extemporaneously, by dropping any volatile oil into ammoniated alcohol, which will readily dissolve the oil, if the ammonia in the solvent be caustic; for, if it be carbonated, such as it was when prepared according to the former directions of the London college, it does not dissolve the oils here ordered, and is therefore totally unfit for this preparation.

Mr Phillips says, that the oils as imported are commonly adulterated with fixed oil, which renders the aromatic spirit coloured and turbid, and that it is therefore the usual practice of chemists to distil the mixture of oils and spirit.

*Medical use.*—Ammonia, thus united with aromatics, is not only more agreeable in flavour, but likewise more accept-

able to the stomach, and less acrimonious, than when uncombined. The dose is from five to six drops to sixty or more.

SPIRITUS AMMONIÆ SUCCINATUS. *Lond.*
*Succinated Spirit of Ammonia.*

Take of
Mastiche, three drachms;
Rectified spirit, nine fluidrachms;
Oil of lavender, fourteen minims;
Oil of amber, four minims;
Solution of ammonia, ten fluidounces.

Macerate the mastiche in the alcohol, until it be dissolved. Pour off the clear tincture; then add the other ingredients, and mix them by shaking.

THIS preparation is intended as a substitute for Eau de Luce, which was formerly imported entirely from Paris. It is now, we believe, prepared also by the chemists and druggists in London; but without some peculiar manipulation, which is kept secret, the above formula does not succeed in giving the liquor that permanent milky opacity, which is deemed essential to good Eau de Luce; for it becomes more or less transparent by keeping. This fancied perfection is, however, in a medical point of view, immaterial; and, whether it be milky or transparent, it is an excellent analeptic remedy, and may be used in the same circumstances, and in the same doses, as the spirit of ammonia itself.

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## CHAP. XXXIII.—MEDICATED WINES.

Wines are to be prepared in corked phials, and frequently shaked during their preparation. *Ed.*

PARMENTIER has laboured to prove that wine is an extremely bad menstruum for extracting the virtues of medical substances. His only argument is, that, by the infusion of vegetable substances in wine, its natural tendency to decomposition is so much accelerated, that at the end of the process, instead of wine, we have only a liquor containing the elements of bad vinegar. As a solvent, diluted alcohol perfectly supersedes the use of wine; and if we wish to use wine to cover the taste, or to assist the operation of any medicine,

M. Parmentier proposes that a tincture of the substance should be extemporaneously mixed with wine as a vehicle.

Notwithstanding this argument appears to us to have great weight, we shall give to the medicated wines, retained in the pharmacopœias, the characters they still generally possess.

### Vinum aloes socotorinæ. *Ed.*
### *Wine of Socotorine Aloes.*

Take of
Socotorine aloes, in powder, one ounce;
Lesser cardamom seeds, bruised,
Ginger, bruised, each one drachm;
Sherry, two pounds.
Digest for seven days, and strain.

### Vinum aloes. *Dub.*
### *Wine of Aloes.*

Take of
Socotorine aloes, four ounces;
Canella alba, one ounce;
Spanish white wine, three pints;
Proof-spirit, one pint.
Powder the aloes and canella alba separately; then mix and pour on the wine, mixed with the spirit; afterwards digest for fourteen days, frequently shaking the vessel; and, lastly, filter the liquor.

### *Lond.*

Take of
Socotorine aloes, eight ounces;
Canella alba, two ounces;
Wine, six pints;
Proof-spirit, two pints.
Triturate the aloes with white sand washed clean, to powder; also powder the canella, and pour the wine and spirit upon these powders mixed together. Macerate for fourteen days, now and then shaking them, and strain.

The sand is added to facilitate the pulverization of the aloes, and to prevent it, when moistened by the fluids, from running together into masses. It is evident that it does not affect the tincture.

This medicine has long been in great esteem, not only as a cathartic, but likewise as a stimulus.

It appears from long experience to be a very useful medicine. The dose, as a purgative, is from one to two ounces. It may be introduced into the habit, so as to be productive of excellent effects, as an alterant, by giving it in small doses, at

proper intervals. Thus managed, it does not for a considerable time operate remarkably by stool; but at length proves purgative, and occasions a lax habit, of much longer continuance than that produced by the other common cathartics.

### VINUM GENTIANÆ COMPOSITUM. *Ed.*
### *Compound Wine of Gentian.*

Take of
- Gentian root, half an ounce;
- Cinchona bark, one ounce;
- Seville orange-peel, dried, two drachms;
- Canella alba, one drachm;
- Weaker alcohol, four ounces;
- Sherry wine, two pounds and a half.

First pour the alcohol on the root and barks, sliced and bruised, and, after twenty-four hours, add the wine; then macerate for seven days, and strain.

THIS wine, which is a pleasant bitter, is intended as a substitute for the old *Tinctura ad Stomachicos.* Wines of this kind are sometimes introduced at the tables of epicures in Italy, to assist the stomach in digestion.

### VINUM IPECACUANHÆ. *Lond. Dub.*
### *Wine of Ipecacuanha.*

Take of
- The root of ipecacuan, bruised, two ounces;
- Spanish white wine, two pints.

Digest seven days, (macerate for fourteen days, *Lond.*), and strain.

### *Ed.*

Take of
- Ipecacuan, bruised, one part;
- Sherry wine, fifteen parts.

Macerate for seven days, and filter through paper.

THESE wines are very mild and safe emetics, and equally serviceable in dysenteries with the ipecacuanha in substance, this root yielding nearly all its virtues to the Spanish white wine. The common dose is an ounce, more or less, according to the age and strength of the patient.

### VINUM NICOTIANÆ TABACI. *Ed.*
### *Tobacco Wine.*

Take of
- The dried leaves of tobacco, one part;
- Sherry wine, twelve parts.

Macerate for seven days, and strain the liquor through paper.

Wine seems to extract more fully the active principles of the tobacco than either water or spirit taken separately.

### Vinum opii. *Lond. Ed.*
### *Wine of Opium.*

Take of
- Extract of opium, one ounce;
- Cinnamon, bruised,
- Cloves, bruised, of each one drachm;
- Sherry wine, one pint, (sixteen ounces, *Ed.)*

Macerate for eight days, and filter.

This is the Tinctura Thebaica of the Dispensatory 1745; the Laudanum Liquidum of Hoffman, which has continued to be popular, notwithstanding its exclusion from the late Pharmacopœias. Mr Ware, in particular, considers it as superior to every other solution of opium as an application in chronic inflammation of the eyes; and, with the same intention, it is sometimes used when inspissated by spontaneous evaporation.

### Vinum rhei. *Ed.*
### *Rhubarb Wine.*

Take of
- Russian rhubarb, sliced, two ounces;
- Canella alba, bruised, one drachm;
- Weaker alcohol, two ounces;
- Sherry wine, fifteen ounces.

Macerate for seven days, and strain through paper.

This is a warm, cordial, laxative medicine. It is used chiefly in weakness of the stomach and bowels, and some kinds of loosenesses, for evacuating the offending matter, and strengthening the tone of the viscera. It may be given in doses of from half a spoonful to three or four spoonfuls or more, acording to the circumstances of the disorder, and the strength of the patient.

### Vinum veratri. *Lond.*
### *Wine of White Hellebore.*

Take of
- White bellebore root sliced, eight ounces;
- Wine, two pints and a half.

Macerate for fourteen days, and filter.

This preparation is now introduced, we are told by Dr Powell, "because it is a medicine usefully and extensively em-

" ployed in practice." This must be understood as applying only to London, for it is not yet known in Edinburgh, although there can be no doubt of its activity.

Extractum Opii Resinosi

## Chap. XXXIV.—EXTRACTS and RESINS.

Extract, in pharmacy, has long been used, in the common and true acceptation of the term, to express a thing extracted, and therefore it was applied to substances of all kinds which were extracted from heterogeneous bodies, by the action of any menstruum, and again reduced to a consistent form, by the evaporation of that menstruum. Lately, however, Extract has been used in a different and much more limited sense, as the name for a peculiar principle, which is often indeed contained in extracts, and which before had no proper appellation. It is in the former sense that we employ it here, and in which we wish it to be only used, while a new word should be invented as the name of the new substance. Till a better be proposed, we shall call it *Extractive.*

The London college have also added to the confusion in their last edition, by applying the term Extract to what are commonly called inspissated juices, where no menstruum is employed.

Extracts are of various kinds, according to the nature of the substances from which they are obtained, and the menstruum employed : but they commonly consist of gum, sugar, extractive, tannin, cinchonin, gallic acid, or resin, or several of them mixed in various proportions. The menstrua most commonly employed are water and alcohol. The former is capable of extracting all the substances enumerated, except the resin, and the latter all except the gum. Wine is also sometimes employed, but very improperly ; for as a solvent it can only act as a mixture of alcohol and water ; and the principles which it leaves behind, on evaporation, are rather injurious than of advantage to the extract.

Water is the menstruum most economically employed in making extracts, as it is capable of dissolving all the active principles except resin, and can have its solvent powers assisted by a considerable degree of heat.

Watery extracts are prepared by boiling the subject in water, and evaporating the strained decoction to a thick consistence.

It is indifferent, with regard to the medicine, whether the subject be used fresh or dry, since nothing that can be preserved in this process will be lost by drying. With regard to the facility of extraction, however, there is a very considerable difference; vegetables in general giving out their virtues more readily when dried than when fresh.

In many cases, it is necessary to assist the action of the menstruum by mechanical division, but it should not be carried so far as to reduce the substance to a very fine powder; as Fabbroni found that cinchona at least yielded a larger proportion of extract when only coarsely powdered.

The quantity of water ought to be no greater than is necessary for extracting the virtues of the subject. This point, however, is not very easily ascertained; for, although some of the common principles of extracts be soluble in a very small proportion of water, there are others, such as the tannin, of which water can dissolve only a certain proportion, and cannot be made to take up more by any length of boiling; besides, we have no very good method of knowing when we have used a sufficient quantity of water; for vegetable substances will continue to colour deeply successive portions of water boiled with them, long after they are yielding nothing to it but colouring matter. One of the best methods is to boil the subject in successive quantities of water, as long as the decoctions form a considerable precipitate with the test which is proper for detecting the substance we are extracting, such as a solution of gelatin for tannin, of alum for extractive, &c.

The decoctions are to be evaporated after they have been filtered boiling hot, without any farther depuration; because some of the most active principles of vegetable substances, such as tannin, are much more soluble in boiling than in cold water, and because almost all of them are very quickly affected by exposure to the atmosphere. Therefore, if a boiling decoction, saturated with tannin, be allowed to cool, the greatest part of the very principle on which the activity of the substance depends will separate to the bottom, and, according to the usual directions, will be thrown away as sediment. The same objection applies more strongly to allowing the decoction to cool, and deposite a fresh sediment, after it has been partially evaporated. Besides, by allowing the decoctions to stand several days before we proceed to their evaporation, we are, in fact, allowing the active principles contained in the decoction to be altered by the action of the air, and to be converted into substances, perhaps inactive, which also are thrown away as sediment.

The evaporation is most conveniently performed in broad shallow vessels; the larger the surface of the liquor, the sooner will the aqueous parts exhale. This effect may likewise be promoted by agitation.

When the matter begins to grow thick, great care is necessary to prevent its burning. This accident, almost unavoidable if the quantity be large, and the fire applied, as usual, under the evaporating basin, may be effectually prevented, by pouring the extract, when it has acquired the consistence of a syrup, into shallow tin or earthen pans, and placing these in an oven with its door open, moderately heated; which, acting uniformly on every part of the liquid, will soon reduce it to any degree of consistence required. This may likewise be done, and more securely, by setting the evaporating vessel in boiling water; but the evaporation is in this way very tedious. Dr Powell has figured a modification of the common tin sauce-pan for this purpose. It is nothing but putting a tin evaporating dish over a sauce-pan filled with water, which is made to boil.

Alcohol is much too expensive to be employed as a menstruum for obtaining extracts, except in those cases where water is totally inadequate to the purpose. These cases are,

1*st*, When the nature of the extract is very perishable when dissolved in water, so that it is liable to be decomposed before the evaporation can be completed, especially if we cannot proceed immediately to the evaporation.

2*dly*, When water is totally incapable of dissolving the substance to be extracted; and,

3*dly*, When the substance extracted can bear the heat of boiling alcohol without being evaporated, but would be dissipated by that of boiling water; that is, when it requires a heat greater than 176°, and less than 212°, for its evaporization.

In the last case, the alcohol must be perfectly free from water, because the heat necessary to evaporate it at the end of the process would frustrate the whole operation. Hence, also, the subject itself ought always to be dry: those substances, which lose their virtue by drying, lose it equally on being submitted to this treatment with the purest alcohol.

In this way the alcoholic extract of some aromatic substances, as cinnamon, lavender, rosemary, retain a considerable degree of their fine flavour.

In the second case, the alcohol need not be so very strong, because it is capable of dissolving resinous substances, although diluted with a considerable proportion of water.

In the first case, the alcohol may be still much weaker;

or rather, the addition of a small proportion of alcohol to water will be sufficient to retard or prevent the decomposition of the decoction.

The alcohol employed in all these cases should be perfectly free from any unpleasant flavour, lest it be communicated to the extract.

The inspissation should be performed from the beginning in the gentle heat of a water-bath. We need not suffer the alcohol to evaporate in the air: the greatest part of it may be recovered by collecting the vapour in common distilling vessels. If the distilled spirit be found to have brought over any flavour from the subject, it may be advantageously reserved for the same purposes again.

When diluted alcohol is employed, the distillation should only be continued as long as alcohol comes over; and the evaporation should be finished in wide open vessels.

In this chapter, we have also included the processes intended for purifying inspissated juices and resinous substances.

Pure resins are prepared, by adding, to spiritous tinctures of resinous vegetables, a large quantity of water. The resin, incapable of remaining dissolved in the watery liquor, separates and falls to the bottom; leaving in the menstruum such other principles of the plant as the spirit might have extracted at first along with it. But this is only practised for the purpose of analysis.

### EXTRACTA PER AQUAM. *Ed.*
*Extracts made with Water.*

Having cut and bruised the substance from which the extract is to be made, pour upon it eight times its weight of distilled water. Boil to the consumption of one-half of the liquor, and strain it by strong expression. Evaporate the decoction immediately, to the consistence of thick honey, in a bath of water saturated with muriate of soda.

### EXTRACTA. *Lond.*
*Extracts.*

In preparing all extracts, evaporate the fluid in a pan, placed in a water-bath, as quickly as possible, until it become of a proper thickness for forming into pills, stirring it constantly towards the end with a spatula.

Sprinkle a little Rectified Spirit on all softer extracts.

### Extracta simpliciora. *Dub.*
*Simple Extracts.*

All simple extracts, unless otherwise ordered, are to be prepared according to the following rule:

The vegetable matter is to be boiled in eight times its weight of water, to one-half; the liquor is then to be expressed, and, after the fæces have subsided, to be filtered; it is then to be evaporated, with a heat between 200° and 212°, until it becomes thickish; and, lastly, it is to be evaporated with a heat less than 200°, and frequently stirred, until it acquire a consistence proper for forming pills.

All extracts, when they begin to get thick, ought to be frequently stirred with a clean iron spatula. They may be reduced to a proper thickness by means of a stove, heated on purpose.

They ought to be preserved as much as possible from the contact of the air, and the softer ones are to be sprinkled with rectified spirit.

In this manner are prepared the following officinal Extracts.

| Extractum | Extract of |
|---|---|
| Absinthii. *Dub.* | Wormwood, from the tops. |
| Glycyrrhizæ. *Dub.* | Liquorice, from the root. |
| Hellebori nigri. *Ed. Dub.* | Black Hellebore, from the root, bruised. |
| Gentianæ luteæ. *Ed.*<br>Gentianæ. *Dub.* | Gentian, from the root, sliced and bruised. |
| Jalapæ. *Dub.* | Jalap, from the root. |
| Rutæ graveolentis. *Ed.*<br>Rutæ. *Dub.* | Rue, from the herb. |
| Sabinæ. *Dub.* | Savin, from the leaves. |
| Anthemidis nobilis. *Ed.*<br>Chamæmeli. *Dub.* | Chamomile, from the dried flowers. |
| Papaveris somniferi. *Ed.* | Poppy-heads, from the capsules, bruised after taking out the seeds. |
| Genistæ. *Dub.* | Broom-tops. |
| Hæmatoxyli campechiani, *Ed.*<br>Hæmatoxyli. *Dub.* | Logwood, from the rasped wood. |
| Quercus. *Dub.* | Oak bark. |
| Taraxaci. *Dub.* | Dandelion, from the herb and root. |

### Extractum aloes purificatum. *Lond.*
*Purified Extract of Aloes.*

Take of

Socotorine aloes, in powder, half a pound;

Boiling water, four pints.

Macerate in a gentle heat for three days, then strain, and

set it at rest till the fæces subside. Pour off the clear liquor, and evaporate to a proper thickness.

This is supposed to be less irritating than the aloes itself, but it appears to be an unnecessary refinement.

### Extractum anthemidis. *Lond.*
*Extract of Chamomile.*

Take of
- Chamomile flowers, dried, one pound;
- Water, one gallon.

Boil down to four pints, and filter the liquor while hot. Then evaporate to a proper thickness.

### Extractum cinchonæ. *Lond.*
*Extract of Cinchona.*

Take of
- Lance-leaved cinchona bark, bruised, one pound;
- Water, one gallon.

Boil to six pints, and filter the liquor while hot. With the same quantity of water, and in the same manner, repeat the boiling and filtration four times. Then reduce all these liquors, mixed together, to a proper thickness, by evaporation.

This extract must be kept in two forms; one *soft*, and fit for making pills; the other *hard* and pulverizable.

### Extractum cinchonæ. *Dub.*
*Extract of Cinchona.*

Take of
- Cinchona, in coarse powder, one pound;
- Water, six pints.

Boil, for a quarter of an hour, in a vessel almost covered; filter the decoction while hot through linen, and set it aside. Boil the residuum again, in the same quantity of water, and filter it in the same manner. This may be repeated a third time, and all the decoctions are to be mixed and reduced to a proper degree of thickness by evaporation.

This extract ought to be kept in two states; one *soft*, adapted for making pills; and the other *hard*, capable of being pulverised.

### Extractum colocynthidis. *Lond.*
*Extract of Colocynth.*

Take of
- Pulp of colocynth, one pound;
- Water, one gallon.

Boil to four pints, and filter the liquor while hot. Lastly, evaporate to a proper thickness.

Mr Phillips says, that it is scarcely possible to boil the colocynth in the assigned quantity of water, and that the extract obtained is remarkably spongy, and very soon becomes hard and mouldy.

### EXTRACTUM COLOCYNTHIDIS COMPOSITUM. *Dub.*
*Compound Extract of Colocynth.*

Take of
- Pith of colocynth, cut small, six drachms;
- Hepatic aloes, one ounce and a half;
- Scammony, half an ounce;
- Lesser cardamom seeds, husked, one drachm;
- Castile soap, softened with warm water, so as to have a gelatinous consistence, three drachms;
- Warm water, one pint.

Digest the colocynth in the water, in a covered vessel, with a moderate heat, for four days. To the liquor, expressed and filtered, add the aloes and scammony, separately reduced to powder: then evaporate the mixture to a proper thickness for making pills, having added, towards the end of the evaporation, the soap-jelly and powdered seeds; and mix all the ingredients thoroughly together.

### EXTRACTUM GENTIANÆ. *Lond.*
*Extract of Gentian.*

Take of
- Gentian root, one pound;
- Boiling water, one gallon.

Macerate for twenty-four hours; then boil down to four pints, and filter the liquor while still hot; lastly, evapoporate it to a proper thickness.

### EXTRACTUM GLYCYRRHIZÆ. *Lond.*
*Extract of Liquorice.*

Take of
- Liquorice root, sliced, one pound;
- Boiling water, one gallon.

Macerate for twenty-four hours; then boil down to four pints, and filter the liquor while still hot; lastly, evaporate it to a proper thickness.

EXTRACTUM HÆMATOXYLI. *Lond.*
*Extract of Logwood.*

Take of
Logwood, bruised, one pound;
Boiling water, one gallon.
Macerate for twenty-four hours, then boil to four pints.—Strain the liquor while hot, and evaporate to a proper consistence.

EXTRACTUM HUMULI. *Lond.*
*Extract of Hops.*

Take of
Hops, four ounces;
Water boiling, a gallon.
Boil down to four pints, strain the hot liquor, and evaporate it to a proper consistence.

IN the former edition 1809, the quantity of hops was half a pound, in regard to which Mr Phillips says that the proportion of water ordered was considerably too small. It has accordingly been corrected.

EXTRACTUM OPII AQUOSUM. *Dub.*
*Watery Extract of Opium.*

Take of
Opium, two ounces;
Boiling water, one pint.
Triturate the opium in the water, for ten minutes; then, after waiting a little, pour off the liquor, and triturate the remaining opium with the same quantity of boiling water, pouring off the infusion in the same manner. This may be repeated a third time. Mix the decanted liquors, and expose the mixture to the air in an open vessel for two days. Lastly, filter through linen, and, by slow evaporation, form an extract.

EXTRACTUM OPII. *Lond.*
*Extract of Opium.*

Take of
Opium, sliced, half a pound;
Water, three pints.
Add a small quantity of the water to the opium, and macerate for twelve hours, that it may soften; then, having gradually added the rest of the water, triturate them, until they become thoroughly mixed, and set the mixture at rest until the fæces subside. Then filter the liquor, and evaporate to a proper thickness.

### Extractum papaveris. *Lond.*
*Extract of Poppy.*

Take of
Poppy heads, bruised without the seeds, one pound;
Boiling water, a gallon.
Macerate for twenty-four hours; then boil to four pints; strain the liquor while hot, and evaporate to a proper thickness.

### Extractum sarsaparillæ. *Lond.*
*Extract of Sarsaparilla.*

Take of
Sarsaparilla root, sliced, one pound;
Boiling water, one gallon.
Macerate for twenty-four hours; then boil to four pints, and filter the liquor while hot; lastly, evaporate to a proper thickness.

### Extractum taraxaci. *Lond.*
*Extract of Dandelion.*

Take of
Fresh dandelion root, bruised, one pound;
Boiling water, one gallon.
Macerate for twenty-four hours; then boil to four pints, and filter the liquor while hot; lastly, evaporate to a proper thickness.

### Extractum valerianæ. *Dub.*
*Extract of Valerian.*

Take of
Valerian root, in coarse powder, six ounces;
Boiling water, three pints.
Mix and digest, with a moderate heat, twenty-four hours, in a covered vessel; and then express the liquor, and evaporate it to a proper thickness.

### Extracta per aquam et alcohol.
*Extracts made with Alcohol.*

Upon the substance to be extracted, in powder, pour four times its weight of stronger alcohol. Digest for four days, and pour off the tincture. Boil the residuum in five pounds of distilled water, for fifteen minutes, and filter the decoction, boiling hot, through linen. Repeat this decoction, and filtration, with the same quantity of distilled water, and reduce the liquor, by evaporation, to the consistence of thin honey. Draw off the alcohol from the tincture,

by distillation, until it also become thick: then mix the liquors, thus inspissated, and evaporate them in a bath of boiling water, saturated with muriate of soda, to a proper consistency.

In this way are prepared,

EXTRACTUM CINCHONÆ LANCIFOLIÆ. *Ed.*
*Extract of Cinchona*, from the bark.

EXTRACTUM CONVOLVULI JALAPÆ. *Ed.*
*Extract of Jalap*, from the root.

EXTRACTUM CINCHONÆ RESINOSUM. *Lond.*
*Resinous Extract of Cinchona.*

Take of
Lance-leaved cinchona, bruised, one pound;
Rectified spirit of wine, four pints.

Macerate for four days, and strain; distil the tincture, in a water-bath, to a proper thickness.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. *Lond.*
*Compound Extract of Colocynth.*

Take of
Pulp of colocynth, sliced, six drachms;
Socotorine aloes, in powder, one ounce and a half;
Scammony, in powder, half an ounce;
Cardamom seeds, powdered, one drachm;
Proof-spirit, one pound.

Macerate the pulp of colocynth in the spirit, with a gentle heat, for four days. Strain the liquor, and add to it the aloes and scammony. Then evaporate to a proper thickness, adding, towards the end of the operation, the cardamom seeds.

EXTRACTUM RHEI. *Lond.*
*Extract of Rhubarb.*

Take of
Rhubarb root, in powder, one pound;
Proof-spirit, one pint;
Water, seven pints.

Macerate, with a gentle heat, for four days; then filter, and set it aside until the fæces subside. Pour off the liquor clear, and evaporate to a proper thickness.

EXTRACTUM JALAPÆ. *Lond.*
*Extract of Jalap.*

Take of
Jalap, in powder, one pound;

Rectified spirit, four pints;
Water, two pints.

Macerate the jalap in the spirit, for four days, and pour off the tincture. Boil the residuum in the water to two pints. Then filter the tincture and decoctions separately, and evaporate the latter, and distil the former until both thicken; lastly, mix the extract with the resin, and evaporate to a proper thickness.

This extract is to be kept in two states, one *soft*, proper for making pills, and one *hard* and pulverizable.

### Extractum cascarillæ resinosum. *Dub.*
*Resinous Extract of Cascarilla.*

Take of
Cascarilla, in coarse powder, one pound;
Rectified spirit of wine, four pints.

Digest for four days; then pour off the tincture, and strain; boil the residuum, in ten pints of water, to two: evaporate the filtered decoction, and distil the tincture, in a retort, till both begin to grow thick; then mix them, and evaporate them to a state fit for making pills. Lastly, they are to be intimately mixed.

In this way are prepared,

### Extractum cinchonæ rubræ resinosum. *Dub.*
*Resinous Extract of Red Cinchona Bark.*

### Extractum jalapæ resinosum. *Dub.*
*Resinous Extract of Jalap.*

### Opium purificatum. *Dub.*
*Purified Opium.*

Take of
Opium, cut into small pieces, one pound;
Proof-spirit of wine, twelve pints.

Digest with a gentle heat, stirring now and then till the opium be dissolved; filter the liquor through paper, and distil in a retort until the spirit be separated: Pour out the liquor which remains, and evaporate, until the extract acquires a proper thickness.

Purified opium must be kept in two forms; one *soft*, proper for forming into pills; the other *hard*, capable of being reduced into powder.

*Lond.*

Very carefully separate opium from all heterogeneous matters, especially those adhering to it on the outside. Opium is to be kept in two states; one *soft*, fit for making pills; and another *hard*, dried in a water-bath, until it become pulverizable.

All these extracts are supposed to contain the virtues of the substances from which they are prepared, in a very pure and concentrated form; but this supposition is, probably in several instances, erroneous; and the directions for preparing them are frequently injudicious and uneconomical.

As the changes which opium and aloes undergo by solution, and subsequent evaporation, have never been ascertained by careful and satisfactory experiments, well-selected pieces of these substances are to be preferred to the preparations in which they are supposed to be purified. As a farther proof of the superiority of good opium over all its preparations, I may also remark, that the latter, however well prepared, soon become mouldy, the former never does.

Mr Phillips, however, prefers the preparing of an extract of opium, by first submitting it to the action of boiling water, as long as any portion of it continues to be dissolved, and then digesting the residuum in rectified spirit, and mixing the watery and alcoholic extracts thus obtained. He found, that 72 parts of opium, dried by steam till it became pulverizable, yielded to cold water 30 parts, then to boiling water 9, and, lastly, to alcohol 7. The first solution or cold infusion was of a deep brownish-red colour, remained transparent, and smelt strongly of opium; the second or decoction was of a pale brown colour, deposited on cooling the greater part of what had been dissolved, and had no smell of opium; and the third or tincture very much resembled common tincture of opium, and furnished, on the addition of water, an abundant yellowish-white precipitate. Dr Powell also says, that proof-spirit by heat dissolves 9-12ths of opium; and water, although heated, only 5-12ths.

Cinchona bark is a medicine of very great importance; but, unfortunately, the proportion of woody fibres, or inert matter, which enters into its composition, is so great, that weak stomachs cannot bear it, when given in quantity sufficient to produce any very powerful effects. On this account the preparation of an extract, which may contain its active principles in a concentrated form, is a desirable object. On this subject there is still much room for experiment. The London college, in its former Pharmacopœia, certainly erred in two important particulars; in the first place, in desiring the de-

coction to be continued until the greatest part of the menstruum was evaporated; and, in the second place, in separating, by filtration, the powder which separated from the decoction after it had cooled. The first error probably originated in the idea, that, by continuing the boiling for a great length of time, more of the bark would be dissolved; but it is now known, that water is incapable of dissolving more than a certain quantity of the active principles of cinchona; and that after the water has become saturated, by continuing the decoction we diminish the quantity of the menstruum, and therefore also diminish the quantity of bark dissolved. It is not easy to account for the second error; for, according to the old idea, that the powder which separated, on cooling, from a saturated decoction of cinchona, was a resinous substance, it surely ought not to have been rejected from what were supposed to be resinous extracts. This precipitate is now known to be caused by the much greater solubility of its active principles in boiling than in cold water; so that the precipitate is not different from what remains in solution. Accordingly, I ascertained, by experiment, that cinchona gave at least one half more extract when the decoction was conducted according to the directions of the Edinburgh college; and the Londou college, in their present Pharmacopœia, have improved their processes on the same principles.

The real advantage of so expensive an agent as alcohol, in preparing any of these extracts, has not been demonstrated; and, if I be not misinformed, it is seldom employed by the apothecaries in preparing even what are called the Resinous Extracts.

### Resina flava. *Dub.*
### *Yellow Resin.*

This remains in the retort after the distillation of oil of turpentine.

Turpentines are combinations of volatile oil and resin which are easily separated by distillation. The process, however, cannot be carried so far as to separate the whole of the oil, without charring and burning part of the resin. In this state it has a brown colour, and a certain degree of transparency, and is well known under the name of Fiddlers Rosin. But if water be added to the residuum of the distillation, and be thoroughly mixed with it by agitation, it becomes opaque, and is called Yellow Rosin.

Yellow rosin is a useful ingredient in the composition of plasters and hard ointments.

### Gummi resinæ. *Lond.*
### *Gum Resins.*

Those gum-resins are to be reckoned the best which are selected so pure that they do not stand in need of purification. But if they seem impure, boil them in water until they grow soft; then squeeze them through a canvas bag, by means of a press. Let them remain at rest till the resinous part subside; then evaporate, in a water-bath, the part of the water decanted off; and towards the end of the evaporation, mix the resinous part with the gummy into a homogeneous mass.

Gum-resins which melt easily may be purified by putting them into an ox bladder, and holding it in boiling water till they become so soft that they can be separated from impurities by pressing them through a hempen cloth.

As one, and perhaps the most active, constituent of gummy resins, as they are called, is of a volatile nature, it is evident that it must be, in a great measure, dissipated in the process just described, and that we cannot expect the same virtues in these substances after they are purified, which they possess in their crude state. This process is, therefore, contrary to the principles of good pharmacy; and such specimens of these gummy resins as stand in need of it to give them an apparent degree of purity, should not be admitted into the shop of the apothecary. Besides, many of the impurities which they usually contain are easily separated, in compounding the preparations or extemporaneous prescriptions into which they enter.

### Styrax purificata. *Lond.*
### *Purified Storax.*

Dissolve storax in rectified spirit of wine, and filter; afterwards reduce the balsam to a proper thickness, by distilling off the spirit with a gentle heat.

### *Dub.*

Digest the storax in water, with a low heat, until it get soft; then express it between iron plates, heated with boiling water; and, lastly, separate it from the water.

Storax is a balsam, or combination of resin and benzoic acid, both of which are soluble in alcohol, and neither of them volatile in the heat necessary for evaporating alcohol. The London process for purifying it is therefore not liable to any chemical objections. The method now directed by the Dublin college is certainly more economical, but must be attended with loss of benzoic acid.

## Chap. XXXV.—POWDERS.

This form is proper for such materials only as are capable of being sufficiently dried to become pulverizable, without the loss of their virtue. There are several substances, however, of this kind, which cannot be conveniently taken in powder; bitter, acrid, fetid drugs are too disagreeable; emollient and mucilaginous herbs and roots are too bulky; pure gums cohere, and become tenacious in the mouth; fixed alkaline salts deliquesce when exposed to the air; and volatile alkalies exhale. Many of the aromatics, too, suffer a great loss of their odorous principles when kept in powder, as in that form they expose a much larger surface to the air.

The dose of powders, in extemporaneous prescription, is generally about half a drachm; it rarely exceeds a whole drachm; and is not often less than a scruple. Substances which produce powerful effects in small doses are not exhibited in this form, unless their bulk be increased by additions of less efficacy; those which require to be given in larger ones are better fitted for other forms.

The most useful vehicle for taking the lighter powders is any agreeable thin liquid. The ponderous powders, particularly those prepared from metallic substances, require a more consistent vehicle, as syrups; for from thin ones they soon subside. Resinous substances, likewise, are most commodiously taken in thick liquors; for in thin ones they are apt to run into lumps, which are not easily diffused.

### In pulverem triti. *Dub.*
*Powders.*

Substances to be powdered, previously dried, are to be pulverized in an iron-mortar. The powder is then to be separated, by shaking it through an hair-sieve, and is to be kept in close vessels.

### Pulvis aloes cum canella. *Dub.*
*Powder of Aloes with Canella.*

Take of
Hepatic aloes, one pound;
White canella, three ounces.

Powder them separately, and then mix them.

This was formerly well known by the title of Hiera Picra. The spicy canella acts as a corrigent to the aloes, but the compound is more adapted to the form of pills, than of powder.

### Pulvis aloes cum guaiaco. *Dub.*
*Powder of Aloes with Guaiac.*

Take of
- Hepatic aloes, one ounce and a half;
- Gum guaiacum, one ounce;
- Aromatic powder, half an ounce.

Rub the aloes and gum guaiacum separately to powder; then mix them with the aromatic powder.

### Pulvis aloes compositus. *Lond.*
*Compound Powder of Aloes.*

Take of
- Socotorine aloes, one ounce and a half;
- Gum-resin guaiac, one ounce;
- Compound powder of cinnamon, half an ounce.

Powder the aloes and guaiac separately; then mix the compound powder of cinnamon with them.

This powder is supposed to combine the sudorific effects of the guaiac with the purgative of the aloes.

### Pulvis aromaticus. *Dub.*
*Aromatic Powder.*

Take of
- Cinnamon, two ounces;
- Smaller cardamom seeds, husked,
- Ginger,
- Long pepper, of each one ounce.

Rub them together to a powder.

*Ed.*

Take of
- Cinnamon bark,
- Smaller cardamom seeds,
- Ginger root, each equal parts.

Reduce them to a very fine powder, which is to be kept in a glass vessel, well closed.

### Pulvis cinnamomi compositus. *Lond.*
*Compound Powder of Cinnamon.*

Take of
- Cinnamon bark, two ounces;

Cardamom seeds, an ounce and a half;
Ginger, one ounce;
Long pepper, half an ounce.

Reduce them together to a very fine powder.

These compositions are agreeable, hot, and spicy, and may be usefully taken in cold phlegmatic habits, and decayed constitutions, for warming the stomach, promoting digestion, and strengthening the tone of the viscera. The dose is from ten grains to a scruple and upwards. The first and third are considerably the warmest, from the long pepper which they contain.

### Pulvis asari compositus. *Ed.*
### *Compound Powder of Asarabacca.*

Take of
The leaves of asarabacca, three parts;
——————— marjoram,
Flowers of lavender, of each one part.

Rub them together to powder.

### *Dub.*

Take of
Dried leaves of asarabacca, one ounce;
Lavender flowers, two drachms.

Powder them together.

These are agreeable and efficacious errhines, and superior to most of those usually sold under the name of *herb snuff.* They are often employed with great advantage in cases of obstinate headach, and of ophthalmia resisting other modes of cure. Taken under the form of snuff, to the extent of five or six grains, at bed-time, they will operate the succeeding day as a powerful errhine, inducing frequent sneezing, and likewise a copious discharge from the nose. It is, however, necessary, during their operation, to avoid exposure to cold.

### Pulvis carbonatis calcis compositus. *Ed.*
### *Compound Powder of Carbonate of Lime.*

Take of
Prepared carbonate of lime, four ounces;
Nutmeg, half a drachm;
Cinnamon bark, one drachm and a half.

Reduce them together to powder.

### Pulvis cretæ compositus. *Lond.*
### *Compound Powder of Chalk.*

Take of
Prepared chalk, half a pound;

Cinnamon bark, four ounces;
Tormentil root,
Gum arabic, of each three ounces;
Long pepper, half an ounce.

Reduce them separately to a very fine powder, and mix them.

The addition of the aromatic coincides with the general intention of the remedy, which is indicated in weakness and acidity of the stomach, and in looseness from acidity.

### Pulvis cretæ compositus cum opio. *Lond.*
### *Compound Powder of Chalk with Opium.*

Take of
Compound powder of chalk, six ounces and a half;
Hard opium, in powder, four scruples.

Mix them.

The addition of the opium renders this a more powerful remedy than the carbonate of lime alone, especially where the diarrhœa proceeds from irritation of the intestinal canal.

### Pulvis contrayervæ compositus. *Lond.*
### *Compound Powder of Contrayerva.*

Take of
Contrayerva root, in powder, five ounces;
Prepared oyster-shells, one pound and a half.

Mix them.

This medicine has a very good claim to the title of an alexipharmic and sudorific. The contrayerva by itself proves very serviceable in low fevers, where the vis vitæ is weak, and a diaphoresis to be promoted. It is probable that the carbonate of lime is of no farther service than to divide this active ingredient, and make it sit more easily on the stomach.

### Pulvis ipecacuanhæ et opii. *Ed.*
### *Powder of Ipecacuan and Opium.*

Take of
Ipecacuan root, in powder,
Opium, of each one part;
Sulphate of potass, eight parts.

Triturate them together into a fine powder.

### Pulvis ipecacuanhæ compositus. *Lond.*
### *Compound Powder of Ipecacuan.*

Take of
Ipecacuan root, in powder,

Hard opium, in powder, each one drachm;
Sulphate of potass, in powder, one ounce.
Mix them.

The sulphate of potass, from the grittiness of its crystals, is perhaps better fitted for tearing and dividing the tenacious opium than any other salt; this seems to be its only use in the preparation. The operator ought to be careful that the opium and ipecacuanha be equally diffused through the whole mass of powder, otherwise different portions of powder must differ in degree of strength.

This powder is one of the most certain sudorifics, and as such was recommended by Dr Dover, as an effectual remedy in rheumatism. Modern practice confirms its reputation, not only in rheumatism, but also in dropsy, and several other diseases, where it is often difficult, by other means, to produce a copious sweat. The dose is from five to twenty grains, according as the patient's stomach and strength can bear it. It is proper to avoid much drinking immediately after taking it, otherwise it is very apt to be rejected by vomiting before any other effects are produced.

### Pulvis jalapæ compositus. *Ed.*
*Compound Powder of Jalap.*

Take of
Jalap root, in powder, one part;
Supertartrate of potass, two parts.
Grind them together to a very fine powder.

The use of the tartrate in this preparation is to break down and divide the jalap; and therefore they are directed to be triturated together, and not separately.

### Pulvis kino compositus. *Lond.*
*Compound Powder of Kino.*

Take of
Kino, fifteen drachms;
Cinnamon, half an ounce;
Hard opium, one drachm.
Reduce them separately to a very fine powder, then mix them.

This, though well known in extemporaneous prescription, is a new officinal preparation, and one which promises to be convenient. It is anodyne and astringent, containing one part of opium in twenty.

### PULVIS OPIATUS. *Ed.*
*Opiate Powder.*

Take of
  Opium, one part;
  Prepared carbonate of lime, nine parts.
Rub them together to a fine powder.

### PULVIS CORNU CERVI cum OPIO. *Lond.*
*Powder of Hartshorn with Opium.*

Take of
  Hard opium, in powder, one drachm;
  Hartshorn, burnt and prepared, one ounce;
  Cochineal, in powder, one drachm.

IN these powders, the opium is the active ingredient; and it is immaterial whether the phosphate or carbonate of lime be used to facilitate its mechanical division.

### PULVIS SALINUS COMPOSITUS. *Ed.*
*Compound Saline Powder.*

Take of
  Muriate of soda,
  Sulphate of magnesia, of each four parts;
  Sulphate of potass, three parts.
Dry the salts with a gentle heat, reduce them to fine powder separately, then rub them together, and keep the mixture in a well-corked phial.

HOWEVER we may explain it, there is little doubt that mixtures of substances of similar characters have often a better effect than either of the ingredients singly. We have perhaps carried our simplifications too far in rejecting all the old farragoes, as we choose to call them. The mixture of salts acts very pleasantly in costive habits, being taken to the extent of a tea-spoonful in half a pint of water before breakfast.

### PULVIS SCAMMONEÆ COMPOSITUS. *Lond.*
*Compound Powder of Scammony.*

Take of
  Scammony,
  Hard extract of jalap, of each two ounces;
  Ginger, half an ounce.
Reduce them separately to a very fine powder, and mix them.

PULVIS SCAMMONII COMPOSITUS. *Ed.*
*Compound Powder of Scammony.*

Take of
Resin of scammony,
Supertartrate of potass, equal parts,
Rub them together to a very fine powder.

In the first of these compositions, the scammony is combined with another purgative little less active than itself, and in the other with one much less so; which difference must be attended to in prescription. The ginger is an useful addition, and will render it less apt to gripe.

PULVIS SENNÆ COMPOSITUS. *Lond.*
*Compound Powder of Senna.*

Take of
Senna leaves,
Supertartrate of potass, of each two ounces;
Scammony, half an ounce;
Ginger, two drachms.
Triturate the scammony by itself, reduce the rest together into a very fine powder, and then mix.

This powder is given as a cathartic, in the dose of two scruples, or a drachm. The scammony is used as a stimulus to the senna; the quantity of the latter necessary for a dose, when not assisted by some more powerful substance, being too bulky to be conveniently taken in this form. The ginger is added to make it sit easier on the stomach, and gripe less.

PULVIS ALUMINIS COMPOSITUS. *Ed.*
*Compound Powder of Alum.*

Take of
Alum, four parts;
Kino, one part.
Rub them together to a fine powder.

This powder is composed of two very powerful astringents, but we doubt whether they be combined with propriety; at least it is certain that a solution of alum is decomposed by a solution of kino.

PULVIS TRAGACANTHÆ COMPOSITUS. *Lond.*
*Compound Powder of Tragacanth.*

Take of
Tragacanth, powdered,
Gum arabic, powdered,
Starch, of each one ounce and a half;
Refined sugar, three ounces.

Powder the starch and sugar together; then add the tragacanth and gum arabic, and mix.

This composition is a mild emollient; and hence becomes serviceable in hectic cases, tickling coughs, strangury, some kinds of alvine fluxes, and other disorders proceeding from a thin acrimonious state of the excreted fluids, or an abrasion of the mucus of the intestines; it is supposed to soften, and give a greater degree of consistency to the former, and defend the latter from being irritated or excoriated by them. All the ingredients coincide in these general intentions. The dose is from half a drachm to two or three drachms, which may be frequently repeated.

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## Chap. XXXVI.—CONSERVES, ELECTUARIES, and CONFECTIONS.

Conserves are compositions of recent vegetable matters, and sugar, beaten together into an uniform mass.

This process is introduced for preserving certain simples, undried, in an agreeable form, with as little alteration as possible in their native virtues; and in some cases it is very advantageous. Vegetables, whose virtues are lost or destroyed in drying, may in this form be kept uninjured for a considerable time; for by carefully securing the mouth of the containing vessel, the alteration, as well as dissipation, of their active principles, is generally prevented; and the sugar preserves them from the corruption which juicy vegetables would otherwise undergo.

The Sugar should be pounded by itself, and passed through a sieve, before it be mixed with the vegetable mass; for without this it cannot be properly incorporated. Rose buds, and some other vegetables, are prepared for mixing with the sugar, by grinding them in a small wooden mill, contrived for that purpose.

There are, however, vegetables whose virtues are impaired by this treatment. Mucilaginous substances, by lying long with sugar, become less glutinous: and astringents sensibly become softer upon the palate. Many of the fragrant flowers are of so tender and delicate a texture, as almost entirely to lose their peculiar qualities on being beaten or bruised.

In general, it is obvious, that in this form, on account of

the large proportion of sugar, only substances of considerable activity can be taken with advantage as medicines. And, indeed, conserves are at present considered chiefly as auxiliaries to medicines of greater efficacy, or as intermediums for joining them together. They are very convenient for reducing into bolusses or pills the more ponderous powders, as submuriate of mercury, the oxides of iron, and other mineral preparations; which, with liquid or less consistent matters, as syrups, will not cohere.

The shops were formerly encumbered with many conserves altogether insignificant; the few now retained have in general either an agreeable flavour to recommend them, or are capable of answering some useful purposes as medicines. Their common dose is the bulk of a nutmeg, or as much as can be taken up at once or twice upon the point of a knife. There is, in general, no great danger of exceeding in the dose.

Electuaries are composed chiefly of powders mixed up with syrups, &c. into such a consistence, that the mass shall neither be too stiff to swallow, nor so thin as to allow the powders to separate, and that a dose may be easily taken up on the point of a knife.

Electuaries are chiefly composed of the milder alterative medicines, and such as are not ungrateful to the palate. The more powerful drugs, as cathartics, emetics, opiates, and the like, (except in officinal electuaries to be dispensed by weight,) are seldom exhibited in this form, on account of the uncertainty of the dose; unpleasant ones, acrids, bitters, fetids, cannot be conveniently taken in it; nor is the form of an electuary well fitted for the more ponderous substances, as mercurials, these being apt to subside on keeping, unless the composition be made very stiff.

The lighter powders require thrice their weight of honey, or of syrup boiled to the thickness of honey, to make them into the consistence of an electuary; of syrups of the common consistence, twice the weight of the powder is sufficient.

Where common syrups are employed, the compound is apt to candy and dry too soon: electuaries of peruvian bark, for instance, made up with syrup alone, will often in a day or two grow too dry for use. This is owing to the crystallization of the sugar. Deyeux, therefore, advises electuaries, confections, and conserves, to be made up with syrups, from which all the crystallizable parts have been separated. For this purpose, the syrups, after being sufficiently evaporated, are to be exposed to the heat of a stove as long as they form any crystals. What remains, probably from the presence of some vegetable acid, has no tendency to crystallize, and is to

be decanted and evaporated to a proper consistence. In hospital practice, the same object may be obtained much more easily by using molasses instead of syrups, and in private practice, by the substitution of a little conserve.

The quantity of an electuary directed at a time in extemporaneous prescription varies much, according to its constituent parts; but is rarely less than the size of a nutmeg, or more than two or three ounces.

### Confectio amygdalarum. *Lond.*
*Confection of Almonds.*

Take of
- Sweet almonds, one ounce;
- Gum arabic, in powder, one drachm;
- Refined sugar, half an ounce.

Having first blanched the almonds, by macerating them in water, and peeling them, beat the whole ingredients into a homogeneous mass.

By triturating this confection with water, we immediately form an almond emulsion, which on many occasions is desirable, as it takes a considerable time to make it from the unmixed materials, and soon spoils after it is made.

### Confectio aurantiorum. *Lond.*
*Confection of Orange-peel.*

Take of
- Fresh orange-peel, grated off, one pound;
- Refined sugar, three pounds.

Bruise the peel in a stone mortar with a wooden pestle; then, adding the sugar, beat them into a homogeneous mass.

### Conserva aurantii. *Dub.*
*Conserve of Orange-peel.*

To the fresh rind of Seville oranges, grated off, add three times its weight of refined sugar, while beating it.

### Conserva citri aurantii. *Ed.*
*Conserve of Orange peel.*

Grate off the rind of Seville oranges, beat it into pulp, and while beating it, add gradually three times its weight of refined sugar.

CONFECTIO ROSÆ CANINÆ. *Lond.*
*Confection of Hips.*

Take of
Pulp of hips, one pound;
Refined sugar, in powder, twenty ounces.

Expose the pulp to a gentle heat in a water-bath, then gradually add the sugar, and beat them into a homogeneous mass.

CONSERVA ROSÆ CANINÆ. *Ed.*
*Conserve of Hips.*

Beat ripe hips, carefully cleaned from the seeds and down, to a pulp; and, while beating it, gradually add three times its weight of double refined sugar.

CONFECTIO ROSÆ GALLICÆ. *Lond.*
*Confection of Red Roses.*

Take of
Red rose buds, with the heels cut off, one pound;
Refined sugar, three pounds.

Beat the petals in a stone mortar; then add the sugar, and reduce the whole to a homogeneous mass.

CONSERVA ROSÆ. *Dub.*
*Conserve of Red Roses.*

Pluck the petals of red rose buds from the calyces; and having cut off the heels, beat them, gradually adding three times their weight of refined sugar.

CONSERVA ROSÆ GALLICÆ. *Ed.*
*Conserve of Red Roses.*

Beat the petals of red rose buds to pulp; and add, during the beating, three times their weight of double refined sugar.

LA GRANGE says, that by infusing the red rose leaves in four times their weight of water, and squeezing them out of the infusion, they lose their bitterness, and are more easily reduced to a pulp, which he then mixes with a thick syrup, prepared by dissolving the sugar in the expressed liquor, and boiling it down to the consistence of an electuary.

It is scarcely necessary to make any particular remarks on these conserves. Their taste and virtues are compounded of those of sugar, and the substance combined with it. The hips are acidulous and refrigerant, the orange rind bitter and stomachic, and the red rose buds astringent.

### Electuarium aromaticum. *Ed.*
*Aromatic Electuary.*

Take of
Aromatic powder, one part;
Syrup of orange-peel, two parts.
Mix and beat them well together, so as to form an electuary.

*Dub.*

Take of
Cinnamon,
Nutmeg, of each half an ounce;
Refined sugar,
Saffron, of each one ounce;
Lesser cardamom seeds, husked,
Cloves, each two drachms;
Precipitated chalk, two ounces;
Syrup of orange-peel, a sufficient quantity.
Powder the aromatics separately, then mix them with the syrup.

### Confectio aromatica. *Lond.*
*Aromatic Confection.*

Take of
Cinnamon bark,
Nutmeg, of each two ounces;
Cloves, one ounce;
Cardamom seeds, half an ounce;
Saffron, dried, two ounces;
Prepared oyster shells, sixteen ounces;
Refined sugar, powdered, two pounds;
Water, one pint.
Reduce the dry substances together to a very fine powder, then gradually add the water, and mix them until they be incorporated.

These compositions are sufficiently grateful, and moderately warm. They are given in the form of a bolus, in doses of from five grains to a scruple, or upwards, as a cordial, or as a vehicle for more active substances. The simple composition of the Edinburgh college serves all these purposes as well as the complicated formula of the other colleges. Mr Phillips also very properly remarks, that in this composition, and indeed in every instance, prepared chalk might be advantageously substituted for oyster shells, as it is hardly possible to reduce the latter to so fine a powder as the former.

ELECTUARIUM CASSIÆ FISTULÆ. *Ed.*
*Electuary of Cassia.*

Take of
Pulp of cassia fistularis, four parts;
Pulp of tamarinds,
Manna, each, one part;
Syrup of pale roses, four parts.

Having bruised the manna in a mortar, dissolve it with a gentle heat in the syrup; then add the pulps, and evaporate with a regularly continued heat to a proper consistence.

ELECTUARIUM CASSIÆ. *Dub.*
*Electuary of Cassia.*

Take of
The fresh extracted pulp of cassia, half a pound;
Manna, two ounces;
Pulp of tamarinds, one ounce;
Syrup of orange-peel, half a pound.

Dissolve the manna, bruised, with a moderate heat in the syrup; then add the pulps; and evaporate slowly the mixture to a proper thickness.

CONFECTIO CASSIÆ. *Lond.*
*Confection of Cassia.*

Take of
Fresh cassia pulp, half a pound;
Manna, two ounces;
Tamarind pulp, one ounce;
Syrup of roses, half a pint.

Bruise the manna; then dissolve it in the syrup, by the heat of a water-bath; lastly, mix in the pulps, and evaporate to a proper thickness.

THESE compositions are very convenient officinals, to serve as a basis for purgative electuaries, and other similar purposes. The tamarinds give them a pleasant acidity, and do not, as might be expected, dispose them to ferment. After standing for four months, the composition has been found no sourer than when first made. This electuary is usually taken by itself, to the quantity of two or three drachms occasionally, for gently loosening the belly in costive habits.

ELECTUARIUM SENNÆ COMPOSITUM. *Ed.*
*Electuary of Senna.*

### CONFECTIO SENNÆ. *Lond.*
*Confection of Senna.*

| Take of | *Ed.* | *Lond.* |
|---|---|---|
| Senna leaves, | eight ounces ; | eight ounces ; |
| Coriander seeds, | four ounces ; | four ounces ; |
| Liquorice root, bruised, | three ounces ; | three ounces ; |
| Figs, | | one pound; |
| Pulp of prunes, | each one pound ; | half a pound ; |
| ——— tamarinds, | half a pound ; | half a pound ; |
| ——— cassia fistula, | | half a pound ; |
| Refined sugar, | two pounds and a half ; | two pounds and a half; |
| Water, | four pounds. | |

Powder the senna with the coriander seeds, and sift out ten ounces of the mixed powder; boil the remainder with the figs and liquorice in four pints of water to one half; express and strain the liquor, which is then to be evaporated to about a pint and a half; dissolve the sugar in it; add this syrup by degrees to the pulps ; and, lastly, mix in the sifted powder.

### ELECTUARIUM SENNÆ. *Dub.*
*Electuary of Senna.*

Take of
Senna leaves, in very fine powder, four ounces;
Pulp of French prunes, one pound;
——— tamarinds, two ounces;
Molasses, a pint and a half;
Essential oil of caraway, two drachms.

Boil the pulps in the syrup to the thickness of honey : then add the powder, and, when the mixture cools, the oil; lastly, mix the whole intimately.

THIS electuary is a very convenient laxative, and has long been in common use among practitioners. Taken to the size of a nutmeg, or more, as occasion may require, it is an excellent laxative for loosening the belly in costive habits. The formula of the Dublin college is much more simple and elegant than the others. Mr Phillips also remarks, that the stalks of the senna, and the husks of the coriander seed, can add but little to the virtues of this compound; but since the decoction must be employed for the figs and liquorice root it is no additional trouble to boil the stalks and husks along with them.

### ELECTUARIUM CATECHU COMPOSITUM. *Ed.*
*Compound Electuary of Catechu.*

Take of
Extract of catechu, four ounces;

Kino, three ounces;
Cinnamon bark,
Nutmeg, each one ounce;
Opium, diffused in a sufficient quantity of Sherry wine, one drachm and a half.
Syrup of red roses, boiled to the consistence of honey, two pounds and a quarter.

Reduce the solids to powder; and having mixed them with the opium and syrup, make them into an electuary.

### ELECTUARIUM CATECHU COMPOSITUM. *Dub.*
*Compound Electuary of Catechu.*

Take of
Catechu, four ounces;
Cinnamon, two ounces;
Kino, three ounces; powder these, then add,
Hard purified opium, diffused in Spanish white wine, a drachm and a half;
Syrup of ginger, evaporated to the consistence of honey, two pounds and a quarter.

Mix them.

THESE electuaries, which do not differ in any material particular, are extremely useful astringent medicines, and are often given in doses of a tea spoonful, frequently repeated, in cases of diarrhœa, &c. Ten scruples contain one grain of opium.

### CONFECTIO SCAMMONEÆ. *Lond.*
*Confection of Scammony.*

Take of
Scammony, in powder, one ounce and a half;
Cloves bruised,
Ginger, in powder, of each six drachms;
Essential oil of caraway, half a fluidrachm;
Syrup of roses, as much as is sufficient.

Reduce the dry substances together to a very fine powder; add the syrup, and triturate them together; lastly, add the oil of caraway, and mix the whole.

### ELECTUARIUM SCAMMONII. *Dub.*
*Electuary of Scammony.*

Take of
Scammony,
Ginger, of each, in powder, one ounce;
Oil of cloves, one scruple;
Syrup of orange-peel, what is sufficient.

Mix the powdered ginger with the syrup: then add the scammony, and lastly the oil.

This electuary is a warm brisk purgative. A drachm contains ten grains of scammony.

### Electuarium opiatum; olim Electuarium thebaicum. *Ed.*

*Opiate Electuary*, formerly called *Thebaic Electuary.*

Take of
- Aromatic powder, six ounces;
- Virginian snake-root, in fine powder, three ounces;
- Opium, diffused in a sufficient quantity of Sherry wine, half an ounce;
- Syrup of ginger, one pound.

Mix them, and form an electuary.

### Confectio opii. *Lond.*

*Confection of Opium.*

Take of
- Hard opium, powdered, six drachms;
- Long pepper, one ounce;
- Ginger, two ounces;
- Caraway seeds, three ounces;
- Syrup, one pint.

Mix the opium with the syrup heated; then add the other ingredients, powdered, and mix.

The action which these electuaries will produce on the living system is abundantly apparent from the nature of their ingredients. They are combinations of aromatics with opium; one grain of opium being contained in thirty-six of the London confection, and in forty-three of the Edinburgh electuary.

### Confectio rutæ. *Lond.*

*Confection of Rue.*

Take of
- Rue leaves, dried,
- Caraway seeds,
- Laurel berries, of each an ounce and a half;
- Sagapenum, half an ounce;
- Black pepper, two drachms;
- Clarified honey, sixteen ounces.

Triturate the dry substances to a very fine powder; then adding the honey, mix the whole.

This was long supposed to be a powerful antihysteric. Its use is now confined to glysters.

## Chap. XXXVII.—TROCHES.

Troches and lozenges are composed of powders made up with glutinous substances into little cakes, and afterwards dried. This form is principally made use of for the more commodious exhibition of certain medicines, by fitting them to dissolve slowly in the mouth, so as to pass by degrees into the stomach, or to act upon the pharynx and top of the trachea; and hence these preparations have generally a considerable proportion of sugar, or other materials grateful to the palate. Some powders have likewise been reduced into troches, with a view to their preservation; though possibly for no very good reason; for the moistening, and afterwards drying them in the air, must rather tend to injure than to preserve them. The lozenges of the confectioner are so superior in elegance to those of the apothecary, that they are almost universally preferred; and hence it probably is that the Dublin and London colleges have entirely omitted them.

### Trochisci carbonatis calcis. *Ed.*
*Troches of Carbonate of Lime.*

Take of
Carbonate of lime, prepared, four ounces;
Gum arabic, one ounce;
Nutmeg, one drachm;
Refined sugar, six ounces.
Powder them together, and form them with water into a mass for making troches.

These are used against acidity of the stomach, especially when accompanied with diarrhœa.

### Trochisci carbonatis magnesiæ. *Ed.*
*Troches of Carbonate of Magnesia.*

Take of
Carbonate of magnesia, six ounces;
Refined sugar, three ounces;
Nutmeg, one scruple.
Powder them, and make them into a mass for troches, with mucilage of tragacanth.

Troches of magnesia are much used for acidity of stomach, and are to be found in every confectioner's shop.

TROCHISCI GLYCYRRHIZÆ GLABRÆ. *Ed.*
*Troches of Liquorice.*

Take of
Extract of liquorice,
Gum arabic, each one part;
Refined sugar, two parts.
Boiling water, a sufficient quantity.

Dissolve and strain; then evaporate the solution over a gentle fire, till it be of a proper consistence for being formed into troches.

THESE are both agreeable pectorals, and may be used at pleasure in tickling coughs. The solution and subsequent evaporation of the extract of liquorice, directed by the Edinburgh college, is exceedingly troublesome, and apt to give the troches an empyreumatic flavour. They are more easily made, by reducing the liquorice also to powder, and mixing up the whole with rose-water. Refined extract of liquorice should be used; and it is easily powdered in the cold, after it has been laid for some days in a dry and rather warm place.

TROCHISCI GLYCYRRHIZÆ CUM OPIO. *Ed.*
*Liquorice Troches with Opium.*

Take of
Opium, two drachms;
Tincture of Tolu, half an ounce;
Common syrup, eight ounces;
Extract of liquorice, softened with warm water,
Gum arabic, in powder, of each five ounces.

Triturate the opium well with the tincture, then add by degrees the syrup and extract; afterwards gradually mix in the powdered gum arabic. Lastly, dry them so as to form a mass, to be divided into troches, each weighing ten grains.

THESE directions for preparing the above troches are so full and particular, that no farther explanation is necessary; seven and a half contain about one grain of opium. These troches are medicines of approved efficacy in tickling coughs depending on irritation of the fauces. Besides the mechanical effect of the viscid matters in involving acrid humours, or lining and defending the tender membranes, the opium no doubt must have a considerable effect, by more immediately diminishing the irritability of the parts themselves.

### TROCHISCI GUMMOSI. *Ed.*
*Gum Troches.*

Take of
 Gum arabic, four parts;
 Starch, one part;
 Refined sugar, twelve parts.
Powder them, and make them into a proper mass with rose-water, so as to form troches.

THIS is a very agreeable pectoral, and may be used at pleasure. It is calculated for allaying the tickling in the throat which provokes coughing.

### TROCHISCI NITRATIS POTASSÆ. *Ed.*
*Troches of Nitrate of Potass.*

Take of
 Nitrate of potass, one part;
 Double refined sugar, three parts.
Rub together to powder, and form them, with mucilage of gum tragacanth, into a mass, to be divided into troches.

THIS is a very agreeable form for the exhibition of nitre; though, when the salt is thus taken without any liquid, (if the quantity be considerable,) it is apt to occasion uneasiness about the stomach, which can only be prevented by large dilution with aqueous liquors.

## CHAP. XXXVIII.—PILLS.

THIS form is peculiarly adapted to those drugs which operate in a small dose, and whose nauseous and offensive taste or smell require them to be concealed from the palate.

Pills should have the consistence of a firm paste, a round form, and a weight not exceeding five grains. Essential oils may enter them in small quantity: deliquescent salts are improper. Efflorescent salts, such as carbonate of soda, should be previously exposed to the air until they fall to powder: deliquescent extracts should have some powder combined with them. The mass should be beaten until it become perfectly uniform and plastic. Powders may be made into pills with extracts, balsams, soap, mucilages, bread crumb, &c.

Gum-resins, and inspissated juices, are sometimes soft enough to be made into pills, without addition: where any

moisture is requisite, spirit of wine is more proper than syrups or conserves as it unites more readily with them, and does not sensibly increase their bulk. Light dry powders require syrups or mucilages; and the more ponderous, as the mercurial and other metallic preparations, thick honey, conserve, or extracts.

Light powders require about half their weight of syrup, or about three-fourths their weight of honey, to reduce them into a due consistence for forming pills. Half a drachm of the mass will make five or six pills of a moderate size.

Gums and inspissated juices are to be first softened with the liquid prescribed; the powders are then to be added, and the whole beat thoroughly together, till they be perfectly mixed.

The masses for pills are best kept in bladders, which should be moistened now and then with some of the same kind of liquid that the mass was made up with, or with some proper aromatic oil.

When the mass is to be divided into pills, a given weight of it is rolled out into a cylinder of a given length, and of an equal thickness throughout, and is then divided into a given number of equal pieces, by means of a simple machine. These pieces are then rounded between the fingers or by a machine; and to prevent them from adhering, they are covered either with starch, or powder of liquorice, or orris root. In Germany the powder of lycopodium is much used.

### Pilulæ aloeticæ. *Ed.*
### *Aloetic Pills.*

Take of
Aloes, in powder,
Soap, equal parts.
Beat them with simple syrup into a mass fit for making pills.

### Pilulæ aloes cum zingibere. *Dub.*
### *Pills of Aloes and Ginger.*

Take of
Hepatic aloes, one ounce;
Ginger root, in powder, one drachm;
Soap, half an ounce;
Essence of peppermint, half a drachm.
Powder the aloes with the ginger, then add the soap and the essence, so as to form an intimate mixture.

PILULÆ ALOES COMPOSITÆ. *Lond.*
*Compound Pills of Aloes.*

Take of
Socotorine aloes, powdered, one ounce;
Extract of gentian, half an ounce;
Oil of caraway, forty minims;
Simple syrup, as much as is sufficient.
Beat them together into a homogeneous mass.

ALTHOUGH soap can scarcely be thought to facilitate the solution of the aloes in the stomach, as was supposed by Boerhaave and others, it is, probably, the most convenient substance that can be added, to give it the proper consistence for making pills. When extract of gentian is triturated with aloes, they re-act upon each other, and become too soft to form pills, so that the addition of any syrup to the mass, as directed by the London college, is perfectly unnecessary; unless, at the same time, some powder be added to give it consistency.

Aloetic pills are much used as warm and stomachic laxatives; they are very well suited for the costiveness so often attendant on people of sedentary lives, and, upon the whole, are one of the most useful articles in the materia medica.

PILULÆ ALOES ET ASSÆ FŒTIDÆ. *Ed.*
*Pills of Aloes and Assafœtida.*

Take of
Socotorine aloes, in powder,
Assafœtida,
Hard soap, equal parts.
Form them into a mass, with mucilage of gum arabic.

THESE pills, in doses of about ten grains, twice a-day, produce the most salutary effects in cases of dyspepsia, attended with flatulence and costiveness.

PILULÆ ALOES ET MYRRHÆ. *Ed.*
*Pills of Aloes and Myrrh.*

Take of
Socotorine aloes, four parts;
Myrrh, two parts;
Saffron, one part.
Beat them into a mass with simple syrup.

*Dub.*

Take of
Hepatic aloes, one ounce;
Myrrh, half an ounce;
Saffron, in powder, two drachms;

Essential oil of caraway, half a drachm;
Syrup, a sufficient quantity.

Powder the aloes and myrrh separately, then mix the whole intimately together.

### Pilulæ aloes cum myrrha. *Lond.*
*Pills of Aloes with Myrrh.*

Take of
Socotorine aloes, two ounces;
Myrrh,
Saffron, of each one ounce;
Simple syrup, as much as is sufficient.

Powder the aloes and myrrh separately; and afterwards beat all the ingredients together into a homogeneous mass.

These pills have long continued in practice, without any other alteration than in the syrup with which the mass is made up, and in the proportion of saffron. The virtues of this medicine may be easily understood from its ingredients. Given to the quantity of half a drachm, or two scruples, they prove considerably cathartic, but they answer much better purposes in smaller doses as laxatives or alteratives.

### Pilulæ assæfœtidæ compositæ. *Ed.*
*Compound Pills of Assafœtida.*

Take of
Assafœtida,
Galbanum,
Myrrh, of each eight parts;
Rectified oil of amber, one part.

Beat them into a mass with simple syrup.

### Pilulæ myrrhæ compositæ. *Dub.*
*Compound Pills of Myrrh.*

Take of
Assafœtida,
Galbanum,
Myrrh, each one ounce;
Rectified oil of amber, half a drachm.

Beat them into a mass with simple syrup.

### Pilulæ galbani compositæ. *Lond.*
*Compound Pills of Galbanum.*

Take of
Galbanum, one ounce;
Myrrh,
Sagapenum, of each one ounce and a half;
Assafœtida, half an ounce;

Simple syrup, as much as is sufficient.
Beat them together into a homogeneous mass.

THESE pills are designed for antihysterics and emmenagogues, and are very well calculated for answering those intentions; half a scruple, a scruple, or more, may be taken every night, or oftener. It is singular, that each of the colleges should have given them different names. The assafœtida is certainly the most powerful article.

PILULÆ COLOCYNTHIDIS COMPOSITÆ. *Ed.*
*Compound Pills of Colocynth.*

Take of
Socotorine aloes,
Scammony, of each eight parts;
Colocynth, four parts;
Oil of cloves,
Sulphate of potass, of each one part.

Reduce the aloes and scammony with the sulphate into a powder; then mix in the colocynth, beat into a very fine powder, and the oil: lastly, make it into a proper mass with mucilage of gum arabic.

*Dub.*

Take of
Pith of colocynth, half an oune,
Hepatic aloes,
Scammony, each one ounce;
Castile soap, two drachms;
Oil of cloves, one drachm.

Powder the aloes, scammony, and colocynth, separately; then triturate them with the soap and the oil, and form them into a mass with simple syrup.

THIS is more powerful in its operation than the simpler aloetic pills.

PILULÆ GAMBOGIÆ COMPOSITÆ. *Ed. Lond.*
*Compound Pills of Gamboge.*

Take of
Gamboge, in powder,
Socotorine aloes in powder,
Compound powder of cinnamon, of each one drachm;
Soap, two drachms.

Mix the powders, then add the soap, and beat the whole into a homogeneous mass.

THIS is a very useful purgative pill, being considerably more active than aloes alone.

PILULÆ AMMONIARETI CUPRI. *Ed.*
*Pills of Ammoniaret of Copper.*

Take of
Ammoniaret of copper, in fine powder, sixteen grains;
Bread crumb, four scruples;
Water of carbonate of ammonia, as much as may be sufficient.
Beat them into a mass, to be divided into thirty-two equal pills.

EACH of these pills weighs about three grains, and contains somewhat more than half a grain of the ammoniaret of copper. They seem to be the best form of exhibiting this medicine.

PILULÆ FERRI COMPOSITÆ. *Lond.*
*Compound Pills of Iron.*

Take of
Myrrh in powder, two drachms;
Subcarbonate of soda,
Sulphate of iron,
Sugar, of each one drachm.
Powder the myrrh with the subcarbonate of soda; next having added the sulphate of iron, rub them again; then beat the whole, mixed together, into a homogeneous mass.

THIS is Griffith's mixture in a solid form, and may often be convenient.

PILULÆ SULPHATIS FERRI COMPOSITÆ. *Ed.*
*Compound Pills of Sulphate of Iron.*

Take of
Sulphate of iron, in powder, one ounce;
Extract of chamomile, one ounce and a half;
Volatile oil of peppermint, one drachm.
Beat into a mass, with simple syrup.

THIS differs from the London pill, which contains the iron in the state of an oxide: in the formula of Edinburgh, the sulphate is exhibited in its saline form. Both are exceedingly good chalybeates.

PILULÆ HYDRARGYRI. *Ed.*
*Mercurial Pills.*

Take of
Purified quicksilver,
Conserve of red roses, of each one ounce;
Starch, two ounces;
Mucilage of gum arabic, a little.

Triturate the quicksilver with the conserve, in a glass mortar, till the globules completely disappear, adding, occasionally, a little mucilage of gum arabic; then add the starch, and beat the whole with a little water into a mass, which is to be immediately divided into four hundred and eighty equal pills.

*Lond. Dub.*

Take of

Purified quicksilver, two drachms;
Confection of red roses, three drachms;
Liquorice root, powdered, one drachm;

Rub the quicksilver with the confection until the globules disappear; then, adding the liquorice powder, mix them together into a homogeneous mass.

The common mercurial pill is one of the best preparations of mercury, and may, in general, supersede most other forms of this medicine. In this preparation the mercury is minutely divided, and probably converted into the black oxide. To effect its mechanical division, it must be triturated with some viscid substance. Soap, resin of guaiac, honey, extract of liquorice, manna, and conserve of roses, have all been, at different times, recommended. The soap and guaiac have been rejected on account of their being decomposed by the juices of the stomach: and the honey, because it was apt to gripe some people. With regard to the others, the grounds of selection are not well understood; perhaps the acid contained in the conserve of roses may contribute to the extinction of the mercury. The mercury is most easily known to be completely extinguished, if no globules appear, on rubbing a very little of the mass with the point of the finger on a piece of paper. As soon as this is the case, it is necessary to mix with the mass a proportion of some dry powder, to give it a proper degree of consistency. For this purpose, powder of liquorice root has been commonly used; but it is extremely apt to become mouldy, and to cause the pills to spoil. The Edinburgh college have, therefore, with great propriety, substituted for it starch, which is a very unalterable substance, and easily procured, at all times, in a state of purity. It is necessary to form the mass into pills immediately, as it soon becomes hard. One grain of mercury is contained in four grains of the Edinburgh mass, and in three of the London and Dublin. The dose of these pills must be regulated by circumstances; from two to six five-grain pills may be given daily.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ. *Lond. Ed.*
*Compound Pills of Submuriate of Mercury.*

Take of
Submuriate of quicksilver,
Precipitated sulphuret of antimony, of each one drachm;
Guaiac, in powder, two drachms.

Triturate the submuriate with the precipitated sulphuret of antimony, and then with the guaiac; and add as much mucilage of gum arabic as will give the mass a proper consistence.

THESE pills were recommended to the attention of the public, about forty years ago, by Dr Plummer, whose name they long bore. He represented them, in a paper which he published in the Edinburgh Medical Essays, as a very useful alterative, and on his authority they were at one time much employed.

PILULÆ OPIATÆ; olim PILULÆ THEBAICÆ. *Ed.*
*Opiate*, formerly *Thebaic Pills.*

Take of
Opium, one part;
Extract of liquorice, (soap?) seven parts;
Jamaica pepper, two parts.

Beat the opium and soap into a pulp, mix them: then add the pepper reduced to powder; and form the whole into a mass.

IT is unfortunate that these compositions should differ so much in strength, the first containing one grain of opium in three, the second one in five, and the last only one grain of opium in ten of the mass. Under the idea that opium is to operate as a sedative, the addition of the pepper is somewhat injudicious. The title adopted by the Edinburgh college is ambiguous, as it may be mistaken for pills of opium, without any addition. That of the Dublin college is better, although it does not mention the only active ingredient, as it is often necessary to conceal from our patients that we are giving them opium, which both the name and smell of the storax enable us to do. But that of the London college is upon the whole perhaps the best.

PILULÆ SAPONIS CUM OPIO. *Lond.*
*Pills of Soap with Opium.*

Take of
Hard opium, in powder, half an ounce;
Hard soap, two ounces.

Beat them into a homogeneous mass.

PILULÆ E STYRACE. *Dub.*
*Storax Pills.*

Take of
Purified storax, three drachms;
Soft purified opium.
Saffron, of each one drachm.
Beat them into an uniform mass.

PILULÆ RHEI COMPOSITÆ. *Ed.*
*Compound Pills of Rhubarb.*

Take of
Rhubarb, in powder, one ounce;
Socotorine aloes, six drachms;
Myrrh, half an ounce;
Volatile oil of peppermint, half a drachm.
Make them into a mass, with syrup of orange-peel.

THIS pill is intended for moderately warming and strengthening the stomach, and gently opening the belly. A scruple of the mass may be taken twice a day.

PILULÆ SUBCARBONATIS SODÆ. *Ed.*
*Pills of Subcarbonate of Soda.*

Take of
Dried subcarbonate of soda, four parts;
Hard soap, three parts.
Beat into a mass with simple syrup.

THIS is one of the most convenient forms of giving soda: It was introduced into use by Dr Beddoes. But the pills were very seldom well prepared. The salt should be previously quite effloresced, and no water should be added, but the mass beat as stiff as possible.

PILULÆ SCILLÆ COMPOSITÆ. *Lond.*
*Compound Pills of Squill.*

Take of
Fresh dried squills, powdered, one drachm;
Ginger powdered,
Hard soap, of each three drachms;
Gum ammoniac, in powder, two drachms.
Mix the powders together, then beat them with the soap, with the addition of as much syrup as will give them a proper consistence.

PILULÆ SCILLÆ CUM ZINGIBERE. *Dub.*
*Squill Pills with Ginger.*

Take of
Powder of squills, one drachm;

Ginger, in powder, two drachms;
Essential oil of aniseed, ten drops.
Triturate together, and form into a mass with jelly of soap.

PILULÆ SCILLITICÆ. *Ed.*
*Squill Pills.*

Take of
Dried root of squills, in fine powder, one scruple;
Gum ammoniac,
Lesser cardamom seeds, in powder,
Extract of liquorice, each one drachm.
Form them into a mass with simple syrup.

THESE are elegant and commodious forms for the exhibition of squills, whether for promoting expectoration, or with the other intentions to which that medicine is applied. As the virtue of the compound is derived chiefly from the squills, the other ingredients are often varied in extemporaneous prescription.

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## CHAP. XXXIX.—CATAPLASMS.

CATAPLASMA FERMENTI. *Lond.*
*Yeast Cataplasm.*

Take of
Flour, one pound;
Bear yeast, half a pint.
Mix and expose to a gentle heat, till the mass begin to swell.

THE yeast excites fermentation in the flour, and converts the whole into a thin dough. This cataplasm is considered as a very efficacious application to putrid or putrescent ulcers or tumours.

CATAPLASMA SINAPEOS. *Dub.*
*Mustard Cataplasm.*

Take of
Mustard seed, powdered,
Crumb of bread, of each half a pound;
Vinegar, as much as is sufficient.
Mix, and make a cataplasm.

Sinapisms may be made stronger, by adding of
Horse-radish root, scraped, two ounces.

CATAPLASMA SINAPIS. *Lond.*
*Mustard Cataplasm.*

Take of
Mustard seed,
Linseed, of each, in powder, half a pound;
Warm vinegar, as much as may be sufficient.
Mix to the thickness of a cataplasm.

CATAPLASMS of this kind are commonly known by the name of *Sinapisms*. They were formerly frequently prepared in a more complicated state, containing garlic, black soap, and other similar articles; but the above simple form will answer every purpose which they are capable of accomplishing. They are employed only as stimulants; they often inflame the part, and raise blisters, but not so perfectly as cantharides. They are frequently applied to the soles of the feet, in the low state of acute diseases, for raising the pulse, and relieving the head. The chief advantage they have depends on the suddenness of their action.

## CHAP. XL.—LINIMENTS, OINTMENTS, CERATES, AND PLASTERS.

THESE are all combinations of fixed oil, or animal fat, with other substances, and differ from each other only in consistence. Deyeux has, indeed, lately defined plasters to be combinations of oil with metallic oxides; but as this would comprehend many of our present ointments, and exclude many of our plasters, we shall adhere to the old meaning of the terms.

*Liniments* are the thinnest of these compositions, being only a little thicker than oil.

*Ointments* have generally a degree of consistence like that of butter.

*Cerates* are firmer, and contain a larger proportion of wax.

*Plasters* are the most solid, and derive their firmness, either from a large proportion of wax, rosin, &c. or from the presence of some metallic oxide, such as that of lead

Plasters should have such a consistence as not to adhere to the fingers when cold, but become soft and plastic when gently heated. The heat of the body should render them tenacious enough to adhere to the skin, and to the substance on which

they are spread. When prepared they are usually formed into rolls, and inclosed in paper. Plasters of a small size are often spread on leather, sometimes on strong paper, or on tinfoil, by means of a spatula gently heated, or the thumb. The leather is cut of the shape wanted, but somewhat larger; and the margin all around, about $\frac{1}{4}$ inch in breadth, is left uncovered, for its more easy removal when necessary. Linen is also used, especially for the less active plasters, which are used as dressings, and often renewed. It is generally cut into long slips, of various breadths, from one to six inches. These may either be dipt into the melted plaster, and passed through two pieces of straight smooth wood, held firmly together, so as to remove any excess of plaster; or, what is more elegant, they are spread on one side only, by stretching the linen, and applying the plaster, which has been melted and allowed to become almost cold, evenly by means of a spatula gently heated, or, more accurately, by passing the linen on which the plaster has been laid, through a machine formed of a spatula fixed by screws, at a proper distance from a plate of polished steel.

The Dublin College prefixes the following general direction:

Tutty and calamine employed in making ointments are prepared in the same manner as chalk.

In making ointments and plasters, the wax, resins, and fats, are to be melted with a moderate heat, then removed from the fire, and constantly stirred, until they cool, adding, at the same time, the dry ingredients, if there be any, in very fine powder.

### SEVUM PRÆPARATUM. *Lond.*
### *Prepared Suet.*

Cut the suet into pieces, melt it over a slow fire, and express it through linen.

### ADEPS PRÆPARATA. *Lond.*
### *Prepared Hogs Lard.*

Cut the lard into pieces, melt it over a slow fire, and express it through linen.

### ADEPS SUILLUS PRÆPARATUS. *Dub.*
### *Prepared Hogs Lard.*

Melt fresh lard, cut in pieces, with a moderate heat, and strain with expression through flannel.

Lard, which is purified by those who sell it, and which is preserved with salt, is to be melted with twice its weight of

boiling water, and the mixture well agitated. Set it then aside until it cool, and separate the fat.

Before proceeding to melt these fats, it is better to separate as much of the membranes as possible, and to wash them in repeated quantities of water until they no longer give out any colour. Over the fire they will be perfectly transparent, and, if they do not crackle on throwing a few drops into the fire, it is a sign that all the water is evaporated, and that the fats are ready for straining, which should be done through a linen cloth without expression. The residuum may be repeatedly melted with a little water, until it become discoloured with the fire. The fluid fat should be poured into the vessels, or bladders, in which it is to be preserved.

These articles had formerly a place also among the preparations of the Edinburgh college. But now they introduce them only into their list of the materia medica; as the apothecary will, in general, find it more for his interest to purchase them thus prepared, than to prepare them for himself; for the process requires to be very cautiously conducted, to prevent the fat from burning or turning black.

### Cera flava purificata. *Dub.*
*Purified Yellow Wax.*

Take of

Yellow wax, any quantity.

Melt it with a moderate heat, remove the scum, and after allowing it to settle, pour it cautiously off from the fæces.

Yellow wax is so often adulterated, that this process is by no means unnecessary.

### Linimentum simplex. *Ed.*
*Simple Liniment.*

Take of

Olive oil, four parts;

White wax, one part.

Melt the wax in the oil with a gentle heat, then stir the mixture well until it become stiff on cooling.

This consists of the same articles which form the Unguentum simplex of the Edinburgh Pharmacopœia, but merely in a different proportion, so as to render the composition thinner; and where a thin consistence is requisite, this may be considered as a very elegant and useful application.

### UNGUENTUM SIMPLEX. *Ed.*
*Simple Ointment.*

Take of
Olive oil, five parts;
White wax, two parts.
Melt the wax in the oil with a gentle heat, then stir the mixture well until it become stiff on cooling.

BOTH these ointments may be used for softening the skin and healing chaps.

### UNGUENTUM CETACEI. *Lond.*
*Ointment of Spermaceti.*

Take of
Spermaceti, six drachms;
White wax, two drachms;
Olive oil, three fluidounces.
Melt them together over a slow fire, and stir them constantly until they be cold.

### UNGUENTUM SPERMATIS CETI. *Dub.*
*Ointment of Spermaceti.*

Take of
White wax, half a pound;
Spermaceti, one pound;
Prepared hogs lard, three pounds.
Make into an ointment.

THIS had formerly the name of *Linimentum album*, and it is perhaps only in consistence that it can be considered as differing from the Unguentum simplex, already mentioned, or the Ceratum simplex, afterwards to be taken notice of.

### CERATUM SIMPLEX. *Ed.*
*Simple Cerate.*

Take of
Olive oil, six parts;
White wax, three parts;
Spermaceti, one part.
Melt the wax and spermaceti with the oil in a gentle heat, then stir the mixture well, until it become stiff on cooling.

### CERATUM CETACEI. *Lond.*
*Cerate of Spermaceti.*

Take of
Spermaceti, half an ounce;
White wax, two ounces;
Olive oil, four fluidounces.

Add the oil to the wax and spermaceti, melted together, and stir until the cerate be cold.

This had formerly the name of *Ceratum album*, and it differs in nothing from the Unguentum cetacei, or Linimentum album as it was formerly called, excepting in consistence, both the wax and the spermaceti bearing a greater proportion to the oil.

### Ceratum simplex. *Lond.*
*Simple Cerate.*

Take of
Olive oil, four fluidounces;
Yellow wax, four ounces.
Add the oil to the melted wax, and mix.

### Unguentum ceræ flavæ. *Dub.*
*Ointment of Yellow Wax.*

Take of
Purified yellow wax, a pound;
Prepared hogs lard, four pounds.
Make into an ointment.

### Unguentum ceræ albæ. *Dub.*
*Ointment of White Wax,*

Is prepared in the same manner, with white wax, instead of yellow.

### Unguentum sambuci. *Lond.*
*Elder Ointment.*

Take of
Elder flowers,
Prepared lard, of each two pounds.
Boil the flowers in the lard till they become crisp; then express through linen.

*Dub.*

Take of
Fresh elder flowers, three pounds;
Prepared hogs lard, four pounds;
Mutton suet, two pounds.
Boil the flowers in the lard until they become crisp; then strain with expression; lastly, add the suet, and melt them together.

Compositions of this kind were formerly very frequent; but vegetables, by boiling in fats and oils, impart to them nothing but a little mucilage, which changes the greasy oils

to drying oils, and any resin or volatile oil they may contain; but this also is never in such quantity as to affect the nature of the fat or fixed oil. We therefore do not suppose that this ointment possesses any properties different from a simple ointment of the same consistence, except its fragrancy.

### Linimentum terebinthinæ. *Lond.*
*Turpentine Liniment.*

Take of
Cerate of resin, one pound;
Oil of turpentine, half a pint.
Add the oil of turpentine to the cerate melted, and mix.

Much used for rubbing parts affected with rheumatic pains, and on sprained joints.

### Ceratum resinæ. *Lond.*
*Cerate of Resin.*

Take of
Yellow resin,
Yellow wax, of each one pound;
Olive oil, one pint.
Melt the resin and wax together with a slow fire; then add the oil, and strain the cerate, while still hot, through linen.

### Unguentum resinæ albæ. *Dub.*
*Ointment of White Resin.*

Take of
Hogs lard, four pounds;
White resin, two pounds.
Yellow wax, one pound.
Make into an ointment, which is to be strained while hot, through a sieve.

### Unguentum resinosum. *Ed.*
*Resinous Ointment.*

Take of
Hogs lard, eight parts;
Pine resin, five parts;
Yellow wax, two parts.
Melt the whole together, and stir the mixture well, until it become stiff on cooling.

These are commonly employed in dressings, for digesting, cleansing, and incarnating wounds and ulcers.

EMPLASTRUM CERÆ. *Lond.*
*Wax Plaster.*

Take of
Yellow wax,
Prepared suet, of each three pounds;
Yellow resin, one pound.
Melt them together, and strain.

EMPLASTRUM SIMPLEX. *Ed.*
*Simple Plaster.*

Take of
Yellow wax, three parts;
Mutton suet,
Pine resin, each two parts.
Melt the whole with a gentle heat, and stir the mixture well, until it stiffen on cooling.

THIS is chiefly used to support the discharge from a part which has been blistered, and was therefore formerly called *Emplastrum attrahens.* Sometimes, however, it irritates too much, on account of the resin; and hence, when designed only for dressing blisters, the resin ought to be entirely omitted, unless where a continuance of the pain and irritation, excited by the vesicatory, is required. Indeed, plasters of any kind are not very proper for dressing blisters; their consistence makes them sit uneasy, and their adhesiveness renders the taking of them off painful. Cerates, which are softer and less adhesive, appear much more eligible: the Ceratum spermatis ceti will serve for general use; and for some particular purposes, the Ceratum resinae flavæ may be applied.

UNGUENTUM ELEMI. *Dub.*
*Ointment of Elemi.*

Take of
Resin of elemi, one pound;
White wax, half a pound;
Prepared hogs lard, four pounds.
Make into an ointment, to be strained through a sieve while hot.

UNGUENTUM ELEMI COMPOSITUM. *Lond.*
*Compound Ointment of Elemi.*

Take of
Elemi, one pound;
Turpentine, ten ounces;
Suet, prepared, two pounds;
Olive oil, two fluidounces.

Melt the elemi with the suet; and having removed it from the fire, mix with it immediately the turpentine and oil; after which strain the mixture through linen.

This ointment, formerly known by the name of *Linimentum Arcæi*, has long been used for digesting, cleansing, and incarnating, and, for these purposes, is preferred by some surgeons to all the other compositions of this kind, probably because it is more expensive.

### Unguentum picis liquidæ. *Lond.*
*Tar Ointment.*

Take of
  Tar,
  Prepared suet, of each one pound.
Melt them together, and express through linen.

*Dub.*

Take of
  Tar,
  Mutton suet prepared, of each half a pound.
Melt them together, and strain through a sieve.

*Ed.*

Take of
  Tar, five parts;
  Yellow wax, two parts.
Melt the wax with a gentle heat, then add the pitch, and strain the mixture constantly until it stiffen on cooling.

These compositions cannot be considered as differing essentially from each other. As far as they have any peculiar activity, this entirely depends on the tar. From the empyreumatic oil and saline matters which it contains, it is undoubtedly of some activity. Accordingly, it has been successfully employed against some cutaneous affections, particularly *tinea capitis*.

### Unguentum resinæ nigræ. *Lond.*
*Ointment of Pitch.*

Take of
  Pitch,
  Yellow wax,
  Yellow resin, of each nine ounces;
  Olive oil, a pint.
Melt together and express through linen.

EMPLASTRUM PICIS COMPOSITUM. *Lond.*
*Compound Pitch Plaster.*

Take of
Burgundy pitch, two pounds;
Frankincense, one pound;
Yellow resin,
Yellow wax, of each four ounces;
Expressed oil of mace, one ounce.

To the pitch, resin, and wax, melted together, add first the frankincense, and then the oil of mace, and mix.

EMPLASTRUM CUMINI. *Lond.*
*Cumin Plaster.*

Take of
Cumin seeds,
Caraway seeds,
Bay berries, of each three ounces;
Burgundy pitch, three pounds;
Yellow wax, three ounces.

Melt the pitch and wax together, and mix with them the rest of the ingredients, powdered.

THIS plaster has been recommended as a moderately warm discutient, and is directed by some to be applied to the hypogastric region, for strengthening the viscera, and expelling flatulencies.

EMPLASTRUM AROMATICUM. *Dub.*
*Aromatic Plaster.*

Take of
Frankincense, three ounces;
Yellow wax, half an ounce;
Cinnamon, in powder, six drachms;
Essential oil of pimento,
———————— lemon, each two drachms.

Melt the frankincense and wax together, and strain; when getting stiff, from being allowed to cool, mix in the cinnamon and oils, and make a plaster.

THIS has been considered as a very elegant stomach plaster. As this kind of compositions, on account of their volatile ingredients, does not keep, it is only made occasionally, and it should be but moderately adhesive, that it may not offend the skin, and may without difficulty be frequently renewed; which such applications, in order to their producing any considerable effect, require to be.

UNGUENTUM SULPHURIS. *Lond.*
*Sulphur Ointment.*

Take of
Sublimed sulphur, three ounces;
Prepared lard, half a pound.
Mix.

*Ed.*

Take of
Hogs lard, four parts;
Sublimed sulphur, one part.
Mix them thoroughly.

*Dub.*

Take of
Prepared lard, four pounds;
Sublimed sulphur, one pound.
Make an ointment.

UNGUENTUM SULPHURIS COMPOSITUM. *Lond.*
*Compound Sulphur Ointment.*

Take of
Sublimed sulphur, half a pound;
White hellebore root, in powder, two ounces;
Nitrate of potass, one drachm;
Soft soap, half a pound;
Prepared lard, a pound and a half.
Mix.

SULPHUR is a certain remedy for the itch, more safe than mercury. A pound of ointment serves for four unctions. The patient is to be rubbed every night, a fourth part of the body at each time. Though the disease may be thus cured by a single application, it is in general advisable to touch the parts most affected for a few nights longer, and to conjoin with the frictions the internal use of sulphur.

UNGUENTUM ACIDI NITROSI. *Ed.*
*Ointment of Nitrous Acid.*

Take of
Hogs lard, one pound;
Nitrous acid, six drachms.
Mix the acid gradually with the melted axunge, and diligently beat the mixture as it cools.

*Dub.*

Take of

Olive oil, one pound;
Prepared hogs lard, four ounces;
Nitrous acid, one ounce, by weight.

Having melted the oil and lard together in a glass vessel, add the acid; digest with a moderate heat, in a water-bath, for a quarter of an hour; then remove them from the bath, and stir them constantly with a glass rod, until they get stiff.

The oil and axunge in this ointment are oxidized; for during the action of the acid upon them, there is a great deal of nitric oxide gas disengaged. It acquires a yellowish colour, and a firm consistency, and forms an efficacious and cheap substitute, in slight cutaneous affections, for the ointment of nitrate of mercury.

### Unguentum infusi cantharidis vesicatoriæ. *Ed.*
*Ointment of Infusion of Cantharides.*

Take of

Cantharides,
White resin,
Yellow wax, each one part;
Hogs lard,
Venice turpentine, each two parts;
Boiling water, four parts.

Macerate the cantharides in the water for a night; then strongly press out and strain the liquor, and boil it with the lard till the water be consumed; then add the resin and wax; and, when these are melted, take the ointment off the fire, and add the turpentine.

### Unguentum lyttæ. *Lond.*
*Ointment of Spanish Flies.*

Take of

Spanish flies, in very fine powder, two ounces;
Distilled water, eight fluidounces.
Cerate of resin, eight ounces.

Boil the water with the flies to one half, and mix the cerate with the filtered liquor, and then evaporate to a proper consistence.

Ointments, containing the soluble parts of the cantharides, uniformly blended with the other ingredients, are more commodious, and in general occasion less pain, though a little less effectual in their action, than the compositions with the fly in substance. A very good stimulating liniment is

composed by melting one part of this with half a part of camphor in powder, and three parts of turpentine.

UNGUENTUM PULVERIS CANTHARIDIS VESICATORIÆ. *Ed.*
*Ointment of the Powder of Cantharides.*

Take of
Resinous ointment, seven parts;
Cantharides, in very fine powder, one part.
Sprinkle the powder into the melted ointment, and stir the mixture constantly, until it become stiff, on cooling.

UNGUENTUM CANTHARIDIS. *Dub.*
*Ointment of Spanish Flies.*

Take of
Ointment of yellow wax, half a pound;
Spanish flies, in powder, an ounce.
Make into an ointment.

CERATUM LYTTÆ. *Lond.*
*Cerate of Cantharides.*

Take of
Cerate of spermaceti, six drachms;
Spanish flies, in very fine powder, one drachm.
Add the flies to the cerate, softened over the fire, and mix.

THIS ointment is employed in the dressing for blisters intended to be made *perpetual*, as they are called, or to be kept running for a considerable time, which in many chronic, and some acute cases, is of great service. Particular care should be taken that the cantharides employed in these compositions be reduced into very subtile powder, and that the mixtures be made as equal and uniform as possible.

EMPLASTRUM LYTTÆ. *Lond.*
*Plaster of Spanish Flies.*

Take of
Spanish flies, in very fine powder, one pound;
Wax plaster, one pound and a half;
Prepared hogs lard, one pound.
Having melted the plaster and lard together, and removed them from the fire, sprinkle in the flies, a little before they become firm, and mix the whole together.

EMPLASTRUM CANTHARIDIS. *Dub.*
*Plaster of Spanish Flies.*

Take of
Purified yellow wax,
Mutton suet, each one pound;

Yellow resin, four ounces;
Cantharides, in fine powder, one pound.

To the wax, suet, and resin melted together, a little before they stiffen, on being allowed to cool, mix in the cantharides, and form an ointment.

EMPLASTRUM CANTHARIDIS VESICATORIÆ. *Ed.*
*Plaster of Cantharides.*

Take of
Mutton suet,
Yellow wax,
White resin,
Cantharides, in very fine powder, each equal weights.

Mix the powder with the other ingredients, previously melted together, and removed from the fire. Stir the mixture constantly, until it get stiff on cooling.

IN making these plasters, from an incautious application of heat, the cantharides sometimes lose their vesicating powers; therefore it is customary, after the blister is spread, to cover its surface with powdered cantharides. The desired effect is also more speedy and certain, if the part to which it is to be applied be well bathed with hot vinegar; and the blister is more easily removed if a bit of thin gauze be interposed between it and the skin.

EMPLASTRUM CALEFACIENS. *Dub.*
*Calefacient Plaster.*

Take of
Plaster of cantharides, one part;
Burgundy pitch, seven parts.

Melt together, with a moderate heat, and make into a plaster.

THIS is a very convenient plaster, being more active as a stimulant and rubefacient than the simple Burgundy pitch plaster, while it will scarcely ever raise a blister.

EMPLASTRUM CANTHARIDIS VESICATORIÆ COMPOSITUM. *Ed.*
*Compound Plaster of Cantharides.*

Take of
Venice turpentine, eighteen parts;
Burgundy pitch,
Cantharides, each twelve parts;
Yellow wax, four parts;
Subacetate of copper, two parts;
Mustard seed,
Black pepper, each one part.

Having first melted the pitch and wax, add the turpentine,

and to these, still hot, add the other ingredients, reduced to a fine powder, and mixed, and stir the whole carefully together, until it become stiff on cooling.

This is supposed to be a most infallible blistering plaster. It certainly contains a sufficient variety of stimulating ingredients.

### Unguentum piperis nigri. *Dub.*
*Ointment of Black Pepper.*

Take of

Prepared lard, one pound;
Black pepper, in powder, four ounces.

Make into an ointment.

This is stimulating and irritating.

### Unguentum veratri. *Lond.*
*Ointment of White Hellebore.*

Take of

White hellebore root, in powder, two ounces;
Prepared hogs lard, eight ounces;
Oil of lemon, twenty minims.

Mix.

### Unguentum hellebori albi. *Dub.*
*Ointment of White Hellebore.*

Take of

Prepared hogs lard, one pound;
White hellebore root, in powder, three ounces.

Make into an ointment.

This is recommended in the itch, and other cutaneous affections.

### Unguentum sabinæ. *Dub.*
*Savine Ointment.*

Take of

Fresh savine leaves, separated from the stalks and bruised, half a pound;
Prepared hogs lard, two pounds;
Yellow wax, half a pound.

Boil the leaves in the lard until they become crisp; then filter with expression; lastly, add the wax, and melt them together.

CERATUM JUNIPERI SABINÆ. *Ed.* CERATUM SABINÆ. *Lond.*
*Cerate of Savine.*

Take of
Fresh savine leaves, bruised, one pound, (two parts, *Ed.)*
Yellow wax, half a pound, (one part, *Ed.)*
Prepared hogs lard, two pounds, (four parts, *Ed.)*
Boil the savine leaves with the lard and wax melted together, and express through linen.

THIS is an excellent issue ointment, being in many respects preferable to those of cantharides. If fresh leaves are not to be had, it may be made by mixing the dried leaves finely powdered, with any ointment of proper consistency.

EMPLASTRUM OXIDI PLUMBI SEMIVITREI. *Ed.*
*Plaster of the Semi-vitrified Oxide of Lead.*

Take of
Semi-vitrified oxide of lead, in powder, one part;
Olive oil, two parts;
Water, what is required.
Boil them, constantly stirring the mixture till the oil and oxide unite.

EMPLASTRUM LITHARGYRI. *Dub.*
*Litharge Plaster.*

Take of
Litharge, in very fine powder, five pounds;
Olive oil, nine pounds;
Boiling water, two pints.
Mix them at a high temperature, (200° to 212°,) constantly stirring until the oil and litharge unite, so as to form a plaster, occasionally supplying the waste of the water with fresh additions.

EMPLASTRUM PLUMBI. *Lond.*
*Lead Plaster.*

Take of
Semi-vitrified oxide of lead in very fine powder, five pounds;
Olive oil, one gallon;
Water, two pints.
Boil together with a slow fire, constantly stirring them, until the oil and oxide of lead acquire by their union the thickness of a plaster. But it will be necessary to add a little more boiling water, if that employed at first be almost all consumed before the end of the operation.

OXIDES of lead, boiled with oils, unite with them into a

plaster of an excellent consistence, and forming a proper basis for several other plasters.

In the boiling of these compositions, a quantity of water must be added, to prevent the plaster from burning and growing black. Such water as it may be necessary to add during the boiling, must be previonsly made hot; for cold liquor would not only prolong the process, but likewise occasion the matter to explode, and be thrown about with violence, to the great danger of the operator: this accident will equally happen upon the addition of hot water, if the plaster be extremely hot. It is therefore better to remove it from the fire a little before each addition of water.

These plasters, which have been long known under the name of Diachylon, are common applications in excoriations of the skin, slight flesh wounds, and the like. They keep the part soft and somewhat warm, and defend it from the air, which is all that can be expected in these cases from any plaster.

### EMPLASTRUM RESINOSUM. *Ed.*
*Resinous Plaster.*

Take of
Plaster of semi-vitrified oxide of lead, five parts;
White resin, one part.

Melt with a gentle fire, and stir constantly until they stiffen on cooling.

### EMPLASTRUM LITHARGYRI CUM RESINA. *Dub.*
*Litharge Plaster with Resin.*

Take of
Litharge plaster, three pounds and a half;
Yellow resin, half a pound.

To the litharge plaster melted with a moderate heat, add the resin, reduced to a very fine powder, that it may melt quickly, and make a plaster.

### EMPLASTRUM RESINÆ. *Lond.*
*Plaster of Resin.*

Take of
Yellow resin, half a pound;
Lead plaster, three pounds.

Add the resin, in powder, to the lead plaster, melted with a slow fire, and mix.

THESE plasters are used as adhesives, for keeping on other dressings; for retaining the edges of recent wounds together when we are endeavouring to cure them by the first inten-

tion, and especially for giving mechanical support to new flesh; and contracting the size of ulcers, in the manner recommended by Mr Baynton, for the cure of ulcers of the legs, a mode of treatment so efficacious, that it has entirely changed the character of these sores.

### Emplastrum assæ fœtidæ. *Ed.*
*Plaster of Assafœtida.*

Take of
- Plaster of semi-vitrified oxide of lead;
- Assafœtida, each two parts;
- Galbanum,
- Yellow wax, each one part.

Melt the plaster and wax, and add to the mixture the gum-resins previously melted and strained, and mix the whole thoroughly.

This plaster is applied to the umbilical region, or over the whole abdomen, in hysteric cases; and sometimes with good effect.

### Emplastrum gummosum. *Ed.*
*Gum Plaster.*

Take of
- Plaster of semi-vitrified oxide of lead, eight parts;
- Gum ammoniacum,
- Galbanum,
- Yellow wax, each one part.

Melt the plaster and wax, and add to the mixture the gum resins previously melted and strained, and mix the whole thoroughly.

### Emplastrum ammoniaci. *Lond.* *Ed.*
*Plaster of Ammoniac.*

Take of
- Strained gum ammoniac, five ounces, (five parts, *Ed.*)
- Acetic acid, half a pint, (weak acetic acid, eight parts, *Ed.*)

Dissolve the ammoniac in the vinegar, then evaporate the solution in an iron pot, by the heat of a water-bath, stirring it constantly till it acquire a proper thickness.

### Emplastrum galbani. *Dub.*
*Plaster of Galbanum.*

Take of
- Plaster of litharge, two pounds;
- Galbanum, half a pound;
- Yellow wax, sliced, four ounces.

Add the plaster and wax to the galbanum, melted, and then melt the whole together with a moderate heat.

EMPLASTRUM GALBANI COMPOSITUM. *Lond.*
*Compound Plaster of Galbanum.*

Take of
Strained galbanum, eight ounces;
Plaster of lead, three pounds;
Turpentine, ten drachms;
Frankincense, in powder, three ounces.

With the galbanum and turpentine melted together, mix first the frankincense, and afterwards the litharge plaster, melted also with a very slow fire, and make a plaster.

ALL these plasters are used as digestives and suppuratives; particularly in abscesses, after a part of the matter has been maturated and discharged, for suppurating or discussing the induration which remains.

EMPLASTRUM OPII. *Lond.*
*Plaster of Opium.*

Take of
Hard opium, in powder, half an ounce;
Frankincense, in powder, three ounces;
Lead plaster, one pound.

Add the opium and frankincense to the melted plaster, and mix.

*Ed.*

Take of
Opium, in powder, half an ounce;
Burgundy pitch, three ounces;
Plaster of semi-vitrified oxide of lead, one pound.

Add the opium and pitch to the melted plaster, and mix them thoroughly.

OPIUM plaster is applied in rheumatisms and other local pains, and is supposed to act by absorption.

CERATUM SAPONIS. *Lond.*
*Soap Cerate.*

Take of
Hard soap, eight ounces;
Yellow wax, ten ounces;
Semi-vitrified oxide of lead, powdered, one pound;
Olive oil, one pint;
Vinegar, one gallon.

Boil the vinegar with the oxide of lead, over a slow fire, constantly stirring, until they unite; then add the soap, and

repeat the boiling in the same manner, until the moisture be entirely evaporated; and, lastly, mix with them the wax previously melted in the oil.

THIS acts in reality as a saturnine application, the soap having only the effect of giving a very convenient degree of adhesiveness.

### EMPLASTRUM SAPONIS. *Lond. Dub.*
*Soap Plaster.*

Take of
Hard soap, sliced, half a pound;
Lead plaster, three pounds.
Mix the soap with the melted plaster, and boil them to the thickness of a plaster.

### EMPLASTRUM SAPONACEUM. *Ed.*
*Saponaceous Plaster.*

Take of
Plaster of semi-vitrified oxide of lead, four parts;
Gum plaster, two parts;
Hard soap, sliced, one part.
To the plasters, melted together, add the soap; then boil for a little.

THESE are supposed to be mild discutients.

### UNGUENTUM CARBONATIS PLUMBI. *Ed.*
*Ointment of Carbonate of Lead.*

Take of
Simple ointment, five parts;
Carbonate of lead, one part.
Mix them thoroughly.

### UNGUENTUM CERUSSÆ sive SUBACETATIS PLUMBI. *Dub.*
*Ointment of Ceruse, or of Subacetate of Lead.*

Take of
Ointment of white wax, one pound;
Ceruse, in very fine powder, two ounces.
Make into an ointment.

THIS is a cooling desiccative ointment of great use when applied to excoriated surfaces.

### UNGUENTUM ACETATIS PLUMBI. *Ed.*
*Ointment of Acetate of Lead.*

Take of
Simple ointment, twenty parts;
Acetate of lead, in very fine powder, one part.

### Unguentum acetatis plumbi. *Dub.*
*Ointment of Acetate of Lead.*

Take of
Ointment of white wax, one pound and a half;
Acetate of lead, one ounce.
Make into an ointment.

### Ceratum plumbi superacetatis. *Lond.*
*Cerate of Superacetate of Lead.*

Take of
Superacetate of lead, in powder, two drachms;
White wax, two ounces;
Olive oil, half a pint.
Melt the wax in seven fluidounces of the oil, and gradually add to these the superacetate of lead, separately triturated with the rest of the oil, and stir the mixture with a wooden spatula until they unite.

These are also excellent cooling ointments, of the greatest use in many cases.

### Ceratum plumbi compositum. *Lond.*
*Compound Cerate of Lead.*

Take of
Solution of subacetate of lead, two fluidounces and a half;
Yellow wax, four ounces;
Olive oil, nine fluidounces;
Camphor, half a drachm.
Mix the melted wax with eight fluidounces of the oil, then remove from the fire; and as soon as the mixture begins to thicken, pour in, by degrees, the solution of subacetate of lead, and stir constantly, with a wooden spatula, until it be cold; then mix in the camphor, previously melted in the rest of the oil.

This composition was much recommended by M. Goulard. It differs from the other saturnine ointments only in consistence.

### Unguentum hydrargyri. *Ed.*
*Ointment of Quicksilver.*

Take of
Purified quicksilver,
Mutton suet, each one part;
Hogs lard, three parts.
Rub the mercury diligently in a mortar with a little of the hogs lard, until the globules entirely disappear; then add the rest of the fats.

This ointment may also be made with double or triple the quantity of quicksilver.

*Dub.*

Take of
Purified quicksilver,
Prepared hogs lard, equal weights.
Triturate them together in a marble or iron mortar, until the globules of quicksilver disappear.

Unguentum hydrargyri mitius. *Dub.*
*Milder Ointment of Quicksilver,*
Is made with twice the quantity of lard.

Unguentum hydrargyri fortius. *Lond.*
*Stronger Mercurial Ointment.*

Take of
Purified quicksilver, two pounds;
Prepared hogs lard, twenty-three ounces;
Prepared mutton suet, one ounce.
First triturate the quicksilver with the suet and a little of the hogs lard, until the globules be extinguished; then add the rest of the lard, and mix.

Unguentum hydrargyri mitius. *Lond.*
*Milder Mercurial Ointment.*

Take of
The stronger ointment of quicksilver, one pound;
Hogs lard, prepared, two pounds.
Mix them.

Linimentum hydrargyri. *Lond.*
*Liniment of Mercury.*

Take of
Stronger mercurial ointment,
Prepared lard, of each four ounces;
Camphor, one ounce;
Rectified spirit, fifteen minims;
Water of ammonia, four fluidounces.
First rub the camphor with the spirit, then with the lard and mercurial ointment, lastly, having gradually added the water of ammonia, mix all the ingredients together.

Unguentum oxidi hydrargyri cinerei. *Ed.*
*Ointment of Grey Oxide of Quicksilver.*

Take of
Grey oxide of quicksilver, one part;

Hogs lard, three parts.
Mix them thoroughly.

These ointments are principally employed, not with a view to their topical action, but with the intention of introducing mercury in an active state into the circulating system, which may be effected by gentle friction on the sound skin of any part, particularly on the inside of the thighs or legs. For this purpose, these simple ointments are much better suited than the more compounded ones, with turpentine and the like, formerly employed; for, by any acrid substance, topical inflammation is apt to be excited, preventing further friction, and giving much uneasiness. To avoid this, it is necessary, even with the mildest and weakest ointment, to change occasionally the place at which the friction is performed.

It is requisite that the ointments in which the mercury is extinguished by trituration should be prepared with very great care; for upon the degree of triture which has been employed, the activity of the mercury very much depends. The addition of the mutton-suet, now adopted by London and Edinburgh, is an advantage to the ointment, as it prevents it from running into the state of oil, which the hogs lard alone, in warm weather, or in a warm chamber, is sometimes apt to do, and which is followed by a separation of its constituent parts. We are even inclined to think, that the proportion of suet, directed by the London college, is too small for this purpose, and, indeed, seems to be principally intended for the more effectual triture of the mercury; but it is much more to be regretted, that in a medicine of such activity, the colleges should not have directed the same proportion of mercury to the fatty matter.

### Emplastrum hydrargyri. *Ed.*
### *Plaster of Quicksilver.*

Take of
Olive oil,
White rosin, each one part;
Purified quicksilver, three parts;
Plaster of semi-vitrified oxide of lead, six parts.

Melt the oil and resin together, and when this mixture is cold, let the quicksilver be rubbed with it till the globules disappear; then add, by degrees, the litharge plaster melted, and let the whole be accurately mixed.

EMPLASTRUM HYDRARGYRI. *Lond.*
*Plaster of Quicksilver.*

Take of
Purified quicksilver, three ounces;
Sulphuretted oil, one fluidrachm;
Litharge plaster, one pound.
Triturate the quicksilver with the sulphuretted oil until the globules disappear; then gradually add the lead plaster melted, and mix the whole together.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO. *Lond. Dub.*
*Plaster of Gum Ammoniac with Quicksilver.*

Take of
Gum ammoniac, strained, one pound;
Purified quicksilver, three ounces;
(Sulphuretted oil, a fluidrachm, *Lond.*)
(Turpentine, two drachms, *Dub.*)
Triturate the quicksilver with the sulphuretted oil, (turpentine, *Dub.*) until its globules disappear; then gradually add the gum ammoniac, melted, and mix them.

THESE mercurial plasters are considered as powerful resolvants and discutients, acting with much greater certainty for these intentions than any composition of vegetable substances alone; the mercury exerting itself in a considerable degree, and being sometimes introduced into the habit in such quantity as to affect the mouth. Syphilitic pains in the joints and limbs, nodes, tophi, and beginning indurations, are said to yield to them sometimes.

UNGUENTUM HYDRARGYRI PRÆCIPITATI ALBI. *Lond.*
*Ointment of White Precipitated Quicksilver.*

Take of
White precipitated quicksilver, one drachm;
Prepared lard, one ounce and a half.
Add the precipitated quicksilver to the lard, melted with a slow fire, and mix.

UNGUENTUM SUBMURIATIS HYDRARGYRI AMMONIATI. *Dub.*
*Ointment of Ammoniated Submuriate of Quicksilver.*

Take of
Ointment of white wax, one pound;
Ammoniated submuriate of quicksilver, an ounce and a half.
Make into an ointment.

THIS is a very elegant mercurial ointment, and frequently made use of in the cure of obstinate cutaneous affections.

UNGUENTUM OXIDI HYDRARGYRI RUBRI. *Ed.*
*Ointment of Red Oxide of Quicksilver.*

Take of
Red oxide of quicksilver by nitric acid, in very fine powder, one part;
Hogs lard, eight parts.
Mix them thoroughly.

UNGUENTUM SUBNITRATIS HYDRARGYRI. *Dub.*
*Ointment of Subnitrate of Quicksilver.*

Take of
Ointment of white wax, half a pound;
Subnitrate of quicksilver, half an ounce.
Make into an ointment.

UNGUENTUM HYDRARGYRI NITRICO-OXYDI. *Lond.*
*Ointment of Nitric Oxide of Quicksilver.*

Take of
Nitric oxide of quicksilver, one ounce;
White wax, two ounces;
Prepared lard, six ounces.
Add the nitric oxide, in very fine powder, to the wax and lard, previously melted together, and mix.

THE oxide should be reduced to very fine powder before it be added to the axunge. This is an excellent stimulating ointment, often of very great service in indolent ill-conditioned sores, when we wish to excite them to greater action. As an eye ointment, its effects are most remarkable, in the cure of all inflammations of the tunica conjunctiva, and more particularly when there is a thickening and swelling of the inner membrane of the palpebrae. In such cases, it seems to act with much greater certainty, if applied immediately after the eyelids have been scarified. In inflammation, accompanied with specks, it has a most powerful effect in removing both. It is also useful in all those ophthalmias which so frequently appear after small pox, measles, and eruptive diseases of the hairy scalp. It is used in the same quantity, and in the same manner as the Unguentum nitratis hydrargyri; and if it prove too stimulating, it may be diluted with axunge. It is useful to know that if it be mixed with any ointment containing resin, the red oxide is very quickly converted into the black, and the ointment gradually loses its red colour, and passes through olive-green to black.

UNGUENTUM SUPERNITRATIS HYDRARGYRI. *Dub.*
*Ointment of Supernitrate of Quicksilver.*

Take of
Distilled quicksilver, one ounce;
Nitrous acid, by weight, two ounces;
Olive oil, one pint;
Prepared hogs lard, four ounces.

Dissolve the quicksilver in the acid; mix the solution with the oil and lard, melted together, and make into an ointment, in the same manner as the ointment of nitrous acid.

UNGUENTUM HYDRARGYRI NITRATIS. *Lond.*
*Ointment of Nitrate of Quicksilver.*

Take of
Purified quicksilver, one ounce;
Nitric acid, eleven fluidrachms;
Prepared hogs lard, six ounces;
Olive oil, four fluidounces,

First dissolve the quicksilver in the acid, and then mix the solution, while hot, with the lard and oil previously melted together.

UNGUENTUM NITRATIS HYDRARGYRI FORTIUS; vulgo UNGUENTUM CITRINUM. *Ed.*
*Stronger Ointment of Nitrate of Quicksilver,* commonly called *Citrine Ointment.*

Take of
Purified quicksilver, one part;
Nitrous acid, two parts;
Olive oil, nine parts;
Hogs lard, three parts.

Dissolve the quicksilver in the acid; then carefully beat up the solution in a glass mortar, with the lard and oil when getting stiff, after having been melted together.

UNGUENTUM NITRATIS HYDRARGYRI MITIUS. *Ed.*
*Milder Ointment of Nitrate of Quicksilver.*

This is prepared in the same way (as the Ointment of nitrate of quicksilver,) with three times the quantity of oil and hogs lard.

THIS ointment, when prepared with lard alone, soon becomes so very hard, that it is necessary to mix it with fresh axunge before it can be used. The substitution of the oil for part of the axunge obviates, in a great measure, this inconvenience. The hardening is entirely owing to the excess of the acid in the solution of mercury. Hence the London col-

lege acted in 1809 very inconsiderately in increasing the quantity of nitrous acid, from two ounces by weight to two fluidounces, which caused, as Mr Phillips found, violent action, and the evolution of much noxious vapour, when the solution of mercury is mixed with the axunge, and renders the ointment extremely corrosive. They have in 1815 corrected this error: But the property which nitrate of mercury, prepared by ebullition, has, of being decomposed by water, furnished me with an easy way of getting rid of all excess of acid, and of procuring the subnitrate of mercury in the state of the most minute division possible. An ointment, prepared with this subnitrate, had a most beautiful golden colour; after six months was perfectly soft; and had all the properties desired.

When the citrine ointment is too hard, it should be softened by triturating it with lard or oil; for, if melted with them, it very soon hardens again.

*Medical use.*—This ointment has the very best effects in herpes, tinea capitis, and similar obstinate cutaneous affections, and is almost specific in psorophthalmia, in those slight excoriations of the tarsi, attended with extreme itching, and in all the inflammations of the eyes, attended by eruptive disorders of the hairy scalp or face. It is most conveniently and effectually used, by rubbing a piece of the size of half a garden pea, with the point of a hair pencil, over the tarsi, among the roots of the ciliæ, and allowing a small quantity to get on the inner membrane of the palpebræ. In obstinate cases, a weak solution of muriate of mercury, used as a collyrium along with this ointment, proves a most powerful remedy.

### Unguentum subacetatis cupri. *Ed.*
### *Ointment of Subacetate of Copper.*

Take of
  Resinous ointment, fifteen parts;
  Subacetate of copper, in very fine powder, one part.
Sprinkle the subacetate upon the ointment melted, and stir constantly, until the mixture get stiff, on cooling.

### Unguentum aeruginis. *Dub.*
### *Ointment of Verdigris.*

Take of
  Ointment of white resin, one pound;
  Prepared verdigris, half an ounce.
Make into an ointment.

This ointment is used for cleansing sores, and keeping

down fungous flesh. Where ulcers continue to run from a weakness in the vessels of the parts, the tonic powers of copper promise considerable advantage.

It is also frequently used with advantage in cases of ophthalmia, depending on scrofula, where the palpebræ are principally affected; but when it is to be thus applied, it is, in general, requisite that it should be somewhat weakened by the addition of a proportion of simple ointment or hogs lard.

### UNGUENTUM OXIDI ZINCI IMPURI. *Ed.*
*Ointment of Impure Oxide of Zinc.*

Take of
Simple liniment, five parts;
Prepared impure oxide of zinc, one part.
Mix them thoroughly.

### UNGUENTUM TUTIÆ. *Dub.*
*Ointment of Tutty.*

Take of
Ointment of white wax, ten ounces;
Prepared tutty, two ounces.
Make into an ointment.

### UNGUENTUM OXIDI ZINCI. *Ed.*
*Ointment of Oxide of Zinc.*

Take of
Simple liniment, six parts;
Prepared oxide of zinc, one part.
Mix them thoroughly.

*Dub.*

Take of
Ointment of white wax, one pound;
Oxide of zinc, an ounce and a half.
Make into an ointment.

### UNGUENTUM ZINCI. *Lond.*
*Ointment of Zinc.*

Take of
Oxide of zinc, one ounce;
Prepared lard, six ounces;
Mix.

THESE ointments are chiefly used in affections of the eye, particularly in those cases where redness arises rather from relaxation than from active inflammation.

CERATUM CARBONATIS ZINCI IMPURI. *Ed.*
*Cerate of Impure Carbonate of Zinc.*

Take of
  Simple cerate, five parts;
  Prepared impure carbonate of zinc, one part.
Mix them thoroughly.

CERATUM CALAMINÆ. *Lond.*
*Cerate of Calamine.*

Take of
  Calamine, prepared,
  Yellow wax, of each half a pound;
  Olive oil, one pint.
Mix the oil with the melted wax, then remove from the fire; and, as soon as the mixture begins to thicken, add the calamine, and stir the cerate constantly until it be cold.

UNGUENTUM CALAMINARIS. *Dub.*
*Calamine Ointment.*

Take of
  Ointment of yellow wax, five pounds;
  Prepared calamine, one pound.
Make into an ointment.

THESE compositions resemble the cerate which Turner strongly recommends in cutaneous ulcerations and excoriations, and which has been usually distinguished by his name. They appear, from experience, to be excellent epulotics; and, as such, are frequently made use of in practice.

EMPLASTRUM OXIDI FERRI RUBRI. *Ed.*
*Plaster of Red Oxide of Iron.*

Take of
  Plaster of semi-vitrified oxide of lead, twenty-four parts;
  White rosin, six parts;
  Yellow wax,
  Olive oil, each three parts;
  Red oxide of iron, in powder, eight parts.
Grind the red oxide of iron with the oil, and then add it to the other ingredients, previously melted, and mix the whole thoroughly.

EMPLASTRUM THURIS. *Dub.*
*Plaster of Frankincense.*

Take of
  Plaster of litharge, two pounds;

Frankincense, half a pound;
Red oxide of iron, three ounces.

Sprinkle the oxide into the plaster and frankincense, melted together, stirring the mixture at the same time, and make into a plaster.

This plaster is used in weakness of the large muscles, as of the loins; and its effects seem to proceed from the mechanical support given to the part, which may also be done by any other plaster that adheres with equal firmness.

# TABLES,

*Shewing the Proportion of* ANTIMONY, OPIUM, *and* QUICKSILVER, *contained in some Compound Medicines.*

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## TARTRATE OF ANTIMONY.

*Wine of Tartrate of Antimony* contains two grains of tartrate of antimony in each ounce. *Ed.*

*Solution of Tartarized Antimony* contains one grain of tartarized antimony in four fluidrachms. *Lond.*

## OPIUM.

*Opiate Confection* contains one grain of opium in about thirty-six grains. *Lond.*

*Opiate Electuary* contains in each drachm about a grain and a half of opium. *Ed.*

*Compound Electuary of Catechu* contains in each ounce about two grains and a half of opium; for one grain of opium is contained in one hundred and ninety-three grains. *Ed.*

*Compound Electuary of Catechu* contains in each ounce about two grains and a half of purified opium. *Dub.*

*Compound Powder of Kino* contains a grain of opium in a scruple. *Lond.*

*Compound Powder of Chalk with Opium* contains one grain of opium in two scruples. *Lond.*

*Compound Powder of Ipecacuan* contains one grain of opium in ten grains. *Lond. Dub.*

*Powder of Ipecacuan and Opium* contains six grains of opium in each drachm, or one grain in ten. *Ed.*

*Powder of Burnt Horn with Opium* contains one grain of opium in ten. *Lond.*

*Opiate Pills* contain six grains of opium in each drachm, or five grains of the pill mass contain half a grain of opium. *Ed.*

*Pills of Storax,* in five grains of the mass, contain one grain of purified opium. *Dub.*

*Pills of Soap with Opium* contain one grain of opium in five *Lond.*

*Tincture of Opium* is made with two scruples of opium in each ounce of the liquid, or with five grains in each drachm; but a drachm of the tincture appears, by evaporation, to contain about three grains and a half of opium. *Ed.*

*Tincture of Opium* contains, in a drachm measure, about four grains and a half of purified opium. *Dub.*

*Camphorated Tincture of Opium* contains in four drachms and a half, by measure, very nearly one grain of purified opium. *Dub.*

*Camphorated Tincture of Opium* is made with two grains of opium in each ounce of liquid. *Ed.*

*Ammoniated Tincture of Opium* is made with about eight grains in each ounce of the liquid, or with about one grain in the drachm. *Ed.*

*Syrup of Opium* contains in an ounce measure about a grain of the watery extract of opium: for the liquor, by the addition of the sugar, is more than doubled in bulk. *Dub.*

*Tincture of Soap and Opium* is made with one scruple of opium in each ounce of the liquid. *Ed.*

*Troches of Liquorice with Opium* contain about one grain of opium in each drachm. *Ed.*

### Quicksilver.

*Solution of Oxymuriate of Quicksilver* contains one grain of oxymuriate of mercury in two fluidounces. *Lond.*

*Quicksilver Pills* contain nearly fifteen grains of quicksilver in each drachm. Each pill contains one grain of quicksilver. *Ed.*

*Quicksilver Pills* contain one grain of quicksilver in three grains. *Lond.*

*Quicksilver Pills* contain in six grains two of quicksilver. *Dub.*

*Compound Pills of Submuriate of Quicksilver* contain a grain of submuriate of quicksilver in about five grains. *Lond.*

*Compound Pills of Submuriate of Quicksilver* contain in about four grains one grain of submuriate of quicksilver. *Ed.*

*Quicksilver Ointment* contains twelve grains of quicksilver in each drachm; made with double quicksilver, each drachm contains twenty-four grains. *Ed.*

*Stronger Quicksilver Ointment* contains one drachm of quicksilver in two drachms. *Lond. Dub.*

*Weaker Quicksilver Ointment* contains one drachm of quicksilver in six drachms. *Lond.*

*Quicksilver Liniment* contains one drachm of quicksilver in about six drachms. *Lond.*

*Quicksilver Plaster* contains about sixteen grains of quicksilver in each drachm. *Ed.*

*Quicksilver with Chalk* contains one grain of quicksilver in three grains. *Lond.*

*Quicksilver with Magnesia*, in three grains, contains two of quicksilver. *Dub.*

*Stronger Ointment of Nitrate of Quicksilver* contains in each drachm four grains of quicksilver. *Ed.*

*Milder Ointment of Nitrate of Quicksilver* contains in each drachm a grain and a half of quicksilver. *Ed.*

*Ointment of Grey Oxide of Quicksilver* contains about fifteen grains of oxide in each drachm. *Ed.*

*Ointment of Red Oxide of Quicksilver* contains in each drachm about seven grains of oxide. *Ed.*

### Arsenic.

*Solution of Arsenic* contains one grain of oxide of arsenic in two fluidrachms. *Lond.*

*Arsenical Solution* contains in each drachm half a grain of oxide. *Ed.*

# POSOLOGICAL AND PROSODIAL TABLE.

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ACACIÆ ārăbĭcæ gummi, ʒ i to ℥ i.
Emulsĭo acaciæ arabicæ, ℔ i to ℔ ij, *daily*.
Mucilāgo acaciæ arabicæ, ʒ i to ℥ i.
Trochisci gummosi, ʒ i to ʒ ij.
Acaciæ catĕchu extractum, gr x to ℈ i.
Electuārĭum acaciæ catechu, ℈ i to ʒ i.
Infūsum acaciæ catechu, ℥ i to ℥ iij.
Tinctūra acaciæ catechu, ʒ i to ʒ ij.
Acētum, ʒ i to ℥ ſs; ℥ i to ℥ ij *in glysters*.
Syrūpus aceti, ʒ i to ʒ ij.
Oxy̆mel, ʒ i to ʒ ij.
Acĭdum acētĭcum tenue, ʒ i to ℥ ſs.
Acidum aceticum scillĭtĭcum, ʒ ſs to ʒ i.
Acidum citrĭcum crystallizātum, gr x to ʒ ſs.
Acidum muriātĭcum, gtt x to gtt xl.
Acidum nitrĭcum vel nitrōsum, gtt v to gtt xx.
dilūtum, gtt x to gtt xl.
Acidum sulphurĭcum dilūtum, gtt x to gtt xl.
aromatĭcum, gtt x to gtt xl.
Aconīti napelli folia, gr i to gr v.
Succus spissātus aconīti napelli, gr ſs to gr iij.
Aether sulphurĭcus, gtt xx to ʒ i.
cum alcohole, ʒ ſs to ʒ ij.
aromatĭcus, ʒ ſs to ʒ ij.
Aetheris nitrĭci spīrĭtus, ʒ ſs to ʒ ij.
Alcohol ammoniātum, ʒ ſs to ʒ i.
aromaticum, ʒ ſs to ʒ i.
fœtidum, ʒ ſs to ʒ i.
succinatum, gtt x to gtt xl.
Allii porri succus, ʒ i to ℥ ſs.
Allii satīvi succus, ʒ i to ℥ ſs.
Aloës extractum, gr v to gr xx.
Decoctum aloës, ℥ ſs to ℥ ij.
Pilulæ aloëticæ, gr x to ℈ i.
Pilulæ aloës et assæfœtidæ, gr x to ℈ i.
Pilulæ aloës et myrrhæ, gr x to ℈ i.
Pulvis aloës composĭtus, gr x to ℈ i.

Pulvis aloës cum canella, gr x to ℈ i.
Tinctūra aloës, ʒ ſs to ʒ ij.
Tinctura aloës et myrrhæ, ʒ ſs to ʒ ij.
Tinctura aloës ætherea, ʒ ſs to ʒ ij.
Vinum aloës, ℥ ſs to ℥ i.
Althææ officinālis decoctum, ℔ i to ℔ ij.
Syrūpus althææ officinalis, ʒ i to ʒ ij.
Alūmen, gr x to ℈ i.
Pulvis alumĭnæ composĭtus, gr x to ʒ ſs.
Ammōniæ aqua, gtt v to gtt x.
dilūta, gtt xv to ʒ ſs.
Aqua acetatis ammōniæ, ʒ ij to ℥ ſs.
Subcarbōnas ammōniæ, gr v to gr x.
Solūtio subcarbonatis ammoniæ, gtt x to ʒ i.
Hydro-sulphurētum ammoniæ, gtt v to gtt x.
Murias ammoniæ, gr x to ʒ ſs.
Ammoniăcum, gr x to ʒ ſs.
Mistūra ammoniaci, ℥ ſs to ℥ i.
Amomi zingiberis pulvis, gr v to ℈ i.
Syrupus amomi zingiberis, ʒ i to ʒ ij.
Tinctura amomi zingiberis, ʒ i to ʒ ij.
Amomi repentis pulvis, gr v to ℈ i.
Tinctūra amomi repentis, ʒ i to ʒ ij.
Tinctura amomi repentis composĭta, ʒ i to ʒ ij.
Amomi zedoariæ pulvis, gr v to ℈ i.
Amygdăli communis oleum fixum, ℥ ſs to ℥ i.
Emulsio amygdali communis, ℔ i to ℔ ij.
Confectio amygdalæ, ʒ i to ℥ ſs.
Amўli mucilago, ʒ i to ℥ i; ℥ iv to ℥ viii *in glysters.*
Trochisci amўli, ʒ i to ʒ ij.
Amўrĭdis gileădensis resīna liquida, gr x to ʒ ſs.
Anēthi grăvĕŏlentis aqua distillāta, ℥ i to ℥ ij.
Anethi fœnicŭli aqua distillāta, ℥ i to ℥ ij.
Oleum volatile anethi fœniculi, gtt ij to gtt v.
Anthemĭdis nobĭlis flōres, ℈ i to ʒ i.
Extractum anthemidis nobilis, gr x to ʒ ſs.
Infūsum anthemidis nobilis, ℥ ſs to ℥ ij.
Oleum anthemidis nobilis, gtt v to gtt x.
Anthemidis pyrĕthri rādix, ℈ i to ʒ ſs.
Antimōnii oxĭdum, gr i to gr x.
Oxĭdum antimonii cum phosphāte calcis, gr iij to gr x.
Sulphurētum antimonii præparātum, gr v to ℈ ij.
Sulphuretum antimonii præcĭpĭtātum, gr i to gr v.
Tartras antimonii, gr ſs to gr iij.
Vinum tartratis antimonii, *Ed.* ʒ ij to ʒ iij.
Vinum antimonii tartarizāti, *Dub.* ʒ i to ʒ ij.

Appii petrosĕlĭni aqua distillāta, ℥ i to ℥ ij.
Arbŭti ūvæ ursi pulvis, gr x to ℈ ij.
Argenti nitras, gr $\frac{1}{8}$ to gr $\frac{1}{4}$.
Ari macŭlāti rādix, gr v to ℈ i.
Aristolochiæ serpentāriæ radix, gr x to ʒ ſs.
  Tinctūra aristolochiæ serpentariæ, ʒ i to ʒ ij.
Arnĭcæ montānæ herba, gr v to gr x.
Arsenĭci oxĭdum album, gr $\frac{1}{8}$ to gr $\frac{1}{4}$.
  Solūtio arsenicālis, gtt v to gtt x.
Artĕmisiæ absinthii herba, ℈ i to ʒ i.
  Extractum artemisiæ absinthii, ℈ ſs to ʒ ſs.
Artemisiæ maritĭmæ cacūmina, ℈ i to ℈ ij.
Artemisiæ santonĭcæ cacumina, ʒ ſs to ʒ i.
Asări Europæi pulvis compositus, gr v to gr x.
Aspidii filĭcis māris pulvis, ʒ i to ʒ ij.
Astragali tragacanthæ gummi, gr x to ʒ i.
  Mucilago astragali tragacanthæ, ʒ i to ʒ ij.
Atropæ belladonnæ folia, gr ſs to gr v.
  Succus spissatus atropæ belladonnæ, gr i to gr v.
Barytæ muriatis solutio, gtt v to gtt x.
Bitūmen petrolĕum sulphurātum, gr x to ʒ ſs.
Bonplandiæ trifoliātæ pulvis, gr x to ʒ i.
  Infusum bonplandiæ trifoliatæ, ℥ ſs to ℥ ij.
  Tinctura bonplandiæ trifoliatæ, ʒ ſs to ʒ i.
Bubōnis galbăni gummi resina, gr x to ℈ i.
  Pilulæ galbani compositæ, gr x to ℈ i.
  Tinctūra galbani, ʒ i to ʒ ij.
Calcis ăquă, ℥ ij to ℥ iv.
  Carbōnas calcis præparātus, ℈ i. to ʒ ii.
  Mistūra carbōnatis calcis, ℥ i to ℥ iv.
  Pulvis carbonatis calcis compositus, ʒ i to ʒ ij.
  Trochisci carbonatis calcis, ʒ i to ʒ ij.
  Solutio muriatis calcis, gtt xl to ʒ ſs.
Camphŏræ pulvis, gr iij to gr x.
  Emulsiō camphorāta, ℥ ſs to ℥ ij.
Canellæ albæ pulvis, gr x to ℈ i.
Capsĭci annui fructus, gr v to gr x.
  Tinctura capsici annui, ʒ i to ʒ ij.
Canthariĭdis vesicatōrii pulvis, gr ſs to gr i.
  Tinctura cantharidis vesicatorii, gtt x to gtt xxx.
Carbo ligni, ʒ ij to ℥ ſs.
Cardamĭnis pratensis flores, ℈ i to ʒ i.
Cari carŭi oleum essentiale, gtt ii to gtt v.
  Spiritus cari carui, ʒ i to ℥ ſs.
  Aqua cari carui, ℥ ſs to ℥ ij.
Cassiæ fistŭlæ electuarium, ʒ i to ℥ i.

Ferŭlæ assæfœtidæ gummi resīna, gr x to ʒ ſs.
  Mistura ferulæ assæfœtidæ, ℥ ſs to ℥ i.
  Pilulæ ferulæ assæfœtidæ, gr x to gr xx.
  Tinctura ferulæ assæfœtidæ, ʒ ſs to ʒ i.
  Tinctura ferulæ assæfœtidæ ammoniata, ʒ ſs to ʒ i.
Gallæ tinctura, ʒ i to ʒ ij.
Gambōgia, gr v to gr x.
  Pilulæ gambōgiæ compositæ, gr x to ℈ i.
Gentiānæ lutĕæ extractum, gr x to ʒ ſs.
  Infūsum gentianæ luteæ, ℥ i to ℥ ij.
  Tinctura gentianæ composita, ʒ i to ʒ ij.
  Vinum gentianæ compositum, ℥ ſs to ℥ i.
Geoffrææ inermis decoctum, ℥ i.
Gei urbani pulvis, ℈ i to ʒ ſs.
Glycyrrhīzæ glabræ extractum, ʒ ſs to ʒ i.
  Trochisci glycyrrhizæ glabræ, ʒ ſs to ʒ i.
  Trochisci glycyrrhizæ glabræ cum opio, ʒ ſs to ʒ i.
Gratiŏlæ officinālis herba, gr x to ℈ i.
Guaiăci officinālis decoctum, ℥ ij to ℥ iv.
  Mistura guaiaci officinalis, ℥ i to ℥ ij.
  Tinctura guaiaci officinalis, ʒ i to ʒ ij.
  Tinctura guaiaci officinalis ammoniata, ʒ i to ʒ ij.
Hæmatoxy̆li Campechiāni extractum, ℈ i to ℈ ij.
Hellĕbŏri nigri extractum, gr v to gr x.
  Tinctura hellebori nigri, ʒ ſs to ʒ i.
Hordĕi distĭchi decoctum, ℥ ij to ℥ iv.
  Decoctum hordei compositum, ℥ ij to ℥ iv.
  Cerevisiæ fermentum, ℥ i to ℥ ij.
Hūmŭli lupŭli extractum, gr v to ℈ i.
  Tinctura humuli lupuli, gtt xxx to gtt l.
Hydrargy̆rum purificatum, ℥ ij to ℥ iv.
  cum creta, gr v to ℈ i.
  cum magnesia, gr v to ℈ i.
  Acētas hydrargy̆ri, gr i to gr v.
  Murias hydrargyri corrosīvus, gr $\frac{1}{8}$ to gr $\frac{1}{2}$.
  Liquor muriatis hydrargyri, ʒ i to ʒ ij.
  Oxidum hydrargyri cinereum, gr i to gr v.
  Oxidum hydrargyri rubrum, gr ſs to gr ij.
  Pilulæ hydrargyri, gr v to gr xv.
  Submurias hydrargyri mitis, gr i to gr v.
  Submurias hydrargyri præcipitatus, gr i to gr v.
  Pilulæ submuriatis hydrargyri compositæ, gr v to gr xv.
  Subsulphas hydrargyri flavus, gr i to gr v.
  Sulphurētum hydrargyri nigrum, ℈ i to ℈ ij.
  Sulphuretum hydrargyri rubrum, gr x to ℈ i.
Hyosciămi nigri succus spissatus, gr i to gr v.

Tinctura hyosciami nigri, $g^{tt}$ xx to $g^{tt}$ xl.
Hysōpi officinalis herba, ℈ i to ʒ i.
Inŭlæ helĕnii radix, ℈ i to ʒ i.
Ipecacuanhæ pulvis, $g^{r}$ xx to ʒ ſs.
Pulvis ipecacuanhæ compositus, $g^{r}$ x to ʒ i.
Vinum ipecacuanhæ, ℥ ſs to ℥ i.
Junipĕri communis oleum volatile, $g^{tt}$ ij to $g^{tt}$ v.
Spiritus juniperi compositus, ℥ ſs to ℥ i.
Juniperi sabinæ extractum, $g^{r}$ x to ℈ i.
Oleum volatīle juniperi sabinæ, $g^{tt}$ v to $g^{tt}$ x.
Kīno pulvis, $g^{r}$ x to ℈ i.
Pulvis kino compositus, $g^{r}$ x to ℈ i.
Tinctura kino, ʒ i to ʒ ij.
Lactūcæ virosæ succus spissatus, $g^{r}$ iij to $g^{r}$ v.
Lactūcārium, $g^{r}$ iij to $g^{r}$ v.
Tinctura lactucarii, $g^{tt}$ l to ʒ ſs.
Lavandŭlæ spicæ oleum volatile, $g^{tt}$ ij to $g^{tt}$ v.
Spiritus lavandulæ spicæ, ʒ ſs to ʒ i.
Spiritus lavandulæ spicæ compositus, ℥ ſs to ℥ i.
Lauri cassiæ pulvis, $g^{r}$ v to ℈ i.
Aqua lauri cassiæ, ℥ i to ℥ ij.
Lauri cinnamōmi pulvis, $g^{r}$ v to ℈ i.
Aqua lauri cinnamomi, ℥ ſs to ℥ i.
Oleum lauri cinnamomi, $g^{tt}$ i to $g^{tt}$ ij.
Spiritus cinnamomi, ʒ ſs to ʒ i.
Tinctura cinnamomi, ʒ i to ʒ ij.
Tinctura cinnamomi composita, ʒ ſs to ʒ ij.
Lauri sassăfras lignum vel radix, ℈ i to ʒ i.
Oleum essentiale lauri sassafras, $g^{tt}$ ij to $g^{tt}$ x.
Leontŏdi taraxăci extractum, $g^{r}$ x to ℈ i.
Lichĕnis islandici decoctum, ℥ i to ℥ ij.
Lini usitātissimi infusum, ℥ i to ℥ ij.
Magnēsia, $g^{r}$ x to ℈ i.
Carbōnas magnesiæ, ℈ i to ʒ i.
Sulphas magnesiæ, ʒ ij to ℥ i.
Malvæ decoctum compositum, ℥ ij to ℥ iv.
Melăleucæ leucădendri oleum volatile, $g^{tt}$ iij to $g^{tt}$ v.
Menthæ piperītæ aqua, ℥ i to ℥ ij.
Oleum volatile menthæ piperitæ, $g^{tt}$ iij to $g^{tt}$ x.
Spiritus menthæ piperitæ, ℥ ſs to ℥ i.
Menthæ pulēgii aqua, ℥ i to ℥ ij.
Oleum volatile menthæ pulegii, $g^{tt}$ ij to $g^{tt}$ v.
Spiritus menthæ pulegii, ℥ ſs to ℥ i.
Menthæ virĭdis aqua, ℥ i to ℥ ij.
Spiritus menthæ viridis, ℥ ſs to ℥ i.
Oleum volatile menthæ viridis, $g^{tt}$ ij to $g^{tt}$ v.
Infusum menthæ viridis compositum, ℥ i to ℥ ij.

Mōri syrupus, ʒ i to ʒ ij.
Moschus, gr v to ℈ i.
Tinctura moschi, ʒ i to ℥ ſs.
Mistura moschi, ʒ ſs to ʒ i.
Myristĭcæ moschatæ spiritus, ℥ ſs to ℥ i.
Myrrha, gr x to ʒ ſs.
Tinctura myrrhæ, ʒ i to ʒ ij.
Myrti pĭmentæ aqua, ℥ i to ℥ ij.
Oleum volatile myrti pimentæ, gtt iij to gtt v.
Spiritus myrti pimentæ, ℥ ſs to ℥ i.
Nicotiānæ tabāci folia, gr ſs to gr v.
Vinum nicotianæ tabaci, gtt xxx to gtt l.
Infusum nicotianæ tabaci,
Onisci aselli, ʒ i to ʒ ij.
Opium, gr ſs to gr ij.
purificatum, gr ſs to gr ij.
Extractum opii, gr ſs to gr ij.
Electuarium opiātum, ʒ ſs to ʒ i.
Pilulæ opiatæ, gr x to ℈ i.
Pulvis opiatus, gr x to ℈ i.
Tinctura opīi, gtt xx to gtt xl.
Tinctura opīi ammoniāta, ʒ ſs to ʒ i.
Tinctura opīi camphŏrāta, ℥ ſs to ℥ i.
Vinum opĭi, gtt xxx to gtt lx.
Origăni vulgāris oleum volătile, gtt iij to gtt v.
Papāveris somniferi extractum, gr i to gr v.
Syrupus papaveris somnifĕri, ʒ ſs to ʒ i.
Papaveris rhœădos syrupus, ʒ i to ʒ ij.
Pimpĭnellæ anīsi oleum volatile, gtt iij to gtt v.
Spiritus pimpĭnellæ anisi, ℥ ſs to ℥ i.
Pīni oleum volatile, gtt x to ʒ ſs; and in tænia ℥ i to ℥ iij.
Plumbi acetatis liquor,
Polygălæ senĕgæ decoctum, ℥ ſs to ℥ ij.
Polygŏnum bistorta, ℈ i to ʒ i.
Potassæ subcarbōnas, gr v to ℈ i.
Aqua sūpercarbonatis potassæ, ℥ iv to ℥ viij.
Aqua subcarbonatis potassæ, ʒ ſs to ʒ i.
Acetas potassæ, ℈ i to ʒ i.
Sulphas potassæ, ʒ i to ℥ ſs.
Sulphas potassæ cum sulphŭre, ʒ i to ℥ ſs.
Sūpersulphas potassæ, ʒ i to ℥ i.
Sulphurētum potassæ, gr v to gr xv.
Aqua sulphurēti potassæ, gtt xx to gtt l.
Tartras potassæ, ʒ i to ℥ i.
Supertartras potassæ, ʒ i to ℥ i.
Nitras potassæ, gr v to ℥ i.
Trochisci nitratis potassæ, ʒ i to ʒ ij.

Aqua alcălīna oxymuriătĭca.
Pyri cydoniæ decoctum, ℥ i to ℥ ij.
Quassiæ excelsæ infusum, ℥ i to ℥ ij.
Tinctura quassiæ excelsæ, ʒ i to ʒ ij.
Quassiæ simaroubæ infusum, ℥ i to ℥ ij.
Querci robŏris decoctum, ℥ i to ℥ ij.
Rhamni cathartĭci syrupus, ℥ ſs to ℥ i.
Rhœi pulvis, gr x to ℈ ij.
Extractum rhœi, gr x to ʒ ſs.
Infusum rhœi, ℥ ij to ℥ iv.
Pilulæ rhœi compositæ, gr x to ʒ ſs.
Tinctura rhœi, ʒ i to ʒ ij. or *as a purgative*, ℥ i to ℥ ij.
Tinctura rhœi et aloës, ℥ ſs to ℥ i.
Tinctura rhœi et gentianæ, ℥ ſs to ℥ i.
Tinctura rhœi composita, ℥ ſs to ℥ i.
Rhododendri chrysănthi folia, gr v to gr x.
Rhoïs toxĭcŏdendri folia, gr ſs to gr ij.
Rĭcĭni commūnis oleum fixum, ℥ ſs to ℥ i.
Rosæ canīnæ conserva, ʒ i to ℥ i.
Rosæ centifoliæ aqua, ℥ i to ℥ ij.
Syrupus rosæ centĭfoliæ, ʒ ij to ℥ ſs.
Rosæ Gallicæ conserva, ʒ i to ℥ i.
Infusum rosæ Gallicæ, ℥ i to ℥ ij.
Mel rosæ Gallicæ, ʒ i to ʒ ij.
Syrupus rosæ Gallicæ, ʒ i to ʒ ij.
Rosmarīni officinalis oleum volatile, gtt iij to gtt v.
Spīritus rosmarini officinalis, ℥ ſs to ℥ i.
Rubiae tinctorum radix, ℈ i to ʒ i.
Rūtæ graveŏlentis extractum, gr x to ℈ i.
Oleum essentiale rutæ graveolentis, gtt iij to gtt v.
Confectio rutæ graveolentis, gr x to ℈ i.
Sagapēnum, gummi resina, gr x to ʒ ſs.
Salĭcis cortex, ℈ i to ʒ i.
Sambūci nigri succus spissatus, ℥ ſs to ℥ i.
Scillæ marĭtimae pulvis, gr i to gr iij.
Acētum scillæ maritimæ, ʒ ſs to ʒ i.
Oxymel scillæ maritimæ, ʒ ſs to ʒ i.
Pilulæ scilliticæ, gr x to ℈ i.
Syrūpus scīllæ marĭtimæ, ʒ i to ʒ ij.
Tinctūra scillæ maritimæ, gtt x to gtt xx.
Smilăcis sarsăparillæ decoctum, ℥ ij to ℥ iv.
Decoctum sarsăpărillæ compositum, ℥ ij to ℥ iv.
Extractum sarsaparillæ, gr x to ʒ i.
Sodæ carbōnas, gr x to ʒ ſs.
Subcarbonas sodæ, gr x to ʒ ſs.
Subcarbonas sodæ exsiccatum, gr v to gr xv.

Aqua supercarbonatis sodæ, ℥ iv to ℥ viii.
Phosphas sodæ, ℥ i to ℥ i ſs.
Sulphas sodæ, ℥ i to ℥ i ſs.
Murias sodæ, ℥ ſs *in glysters.*
Subboras sodæ, gr x to ʒ ſs.
Mel subboras sodæ, ʒ ſs to ʒ i.
Solani dulcāmaræ decoctum, ℥ i to ℥ ij.
Spigēliæ marīlandicae radix, ℈ ſs to ℈ i.
Spongĭæ ustæ pulvis, ʒ i to ℥ i.
Stanni tinctura, ℥ ſs to ℥ i.
Styrācis benzoini tinctura composita, ʒ i to ʒ ij.
Succini oleum, gtt x to gtt xx.
Sulphur sublimatum, ℈ i to ʒ i.
Oleum sulphŭrātum, gtt x to gtt xxx.
Toluīferæ balsami tinctura, ʒ i to ʒ ij.
Syrupus toluiferæ balsami, ʒ i to ʒ ij.
Tormentillæ erectæ radix, ℈ i to ℈ ij.
Valeriānæ officinalis pulvis, ℈ i to ʒ i.
Tinctura valerianæ, ʒ i to ʒ ij.
Tinctura valerianæ ammoniata, ʒ ſs to ʒ i.
Extractum valerianæ, gr x to ℈ i.
Infusum valerianæ, ℥ ſs to ℥ ij.
Veratri albi decoctum,
Vinum veratri albi,
Tinctura veratri albi, gtt v to gtt x.
Ulmi cortex, ℈ i to ʒ i.
Viŏlæ syrupus, ʒ i to ʒ ij.
Zinci oxidum, gr iij to gr x.
Sulphas zinci, gr v to ʒ ſs.

*N. B.* These are in general the doses for adults from twenty to sixty, but they may be diminished for children and people past the prime of life, nearly in the following proportions.

| | Ages | | Proportionate doses. |
|---|---|---|---|
| Months | 2 | – | – $\frac{1}{15}$ |
| | 7 | – | – $\frac{1}{12}$ |
| | 14 | – | – $\frac{1}{8}$ |
| | 28 | – | – $\frac{1}{5}$ |
| Years | 3 | – | – $\frac{1}{4}$ |
| | 5 | – | – $\frac{1}{3}$ |
| | 7 | – | – $\frac{1}{2}$ |
| | 14 | – | – $\frac{2}{3}$ |
| | 63 | – | – $\frac{11}{12}$ |
| | 77 | – | – $\frac{5}{6}$ |
| | 100 | – | – $\frac{4}{6}$ |

The practice of administering active fluids by drops has been long known to be inaccurate; but the extent of the evil has been only lately ascertained, by the accurate experiments of

Mr Shuttleworth, surgeon, of Liverpool. Not only do the drops of different fluids from the same vessel, and of the same fluids from different vessels, differ much in size; but it appears that the drops of the same fluid differ, even to the extent of a third, from different parts of the lip of the same vessel. The custom of dropping active fluids should, therefore, be abolished entirely; and, as weighing is too troublesome and difficult for general use, we must have recourse to small measures, accurately graduated, in the manner of Lane's *drop* measure, and the grain measure recommended by the Edinburgh college; but we must not be misled by their names; for they are measures of bulk, not of drops or of grains.

In the following table, the first column shews the weight, the second the number of drops, and the third the weight, of the extract, in a measured drachm of several active fluids, in circumstances as nearly similar as possible, as ascertained by Mr Shuttleworth; the last column shews the number of drops in a drachm of different fluids, according to Dr Niemann.

| | Grains. | Drops. | Grains. | Drops |
|---|---|---|---|---|
| Distilled water, - | 60 | 60 | | 60–80 |
| Dr Fowler's solution of arsenic, - | 60¼ | 60 | | |
| White wine, - | 58¾ | 94 | | |
| Ipecacuanha wine, | 59¾ | 84 | 2½ | |
| Antimonial wine, | 59¾ | 84 | | |
| Rectified spirits of wine, | 51½ | 151½ | | |
| Proof spirit, - | 55¼ | 140 | | |
| Laudanum, - | 59½ | 134 | 2¾ | 90–110 |
| Tincture of foxglove, | 58 | 144 | | |
| Balsam of copaiva, - | | | | 60–70 |
| Spring water, - - | | | | 60–70 |
| Diluted mineral acid, - | | | | 60–80 |
| Water of ammonia, | | | | 100–120 |
| Spirit of sulphuric eth er, | | | | 120–140 |
| Tinctures, - - | | | | 140–180 |
| Ether, - - | | | | 140–180 |

A tea-cup commonly contains three or four ounces of an infusion, decoction, or mixture; a wine-glass about an ounce and a half; a table-spoon about half an ounce of watery fluids, and two or three drachms of alcoholic: a tea-spoon from half a scruple to a scruple of a light powder, such as magnesia, from half a drachm to two scruples of a heavier powder, as sulphur, and from one drachm to four scruples of a metallic oxide; from one scruple to half a drachm of alcoholic fluids, from half a drachm to two scruples of watery fluids; from two scruples to two drachms of tinctures aud syrups, and from one to two drachms of electuaries. But all this is very uncertain.

TABLE OF SYNONIMES *of the Medicines, simple and compound, in the Pharmacopœias of London, Dublin, and Edinburgh.*

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| ACACIAE ARABICAE GUMMI | Gummi Arabicum | Acaciae gummi | Mimosae niloticae gummi |
| Mucilago acaciae Arabicae | Mucilago | Mucilago acaciae | Mucilago gummi Arabicae |
| Emulsio acaciae Arabicae | Emulsio Arabica | | |
| Acaciae catechu extractum | Catechu | Extractum catechu | Terra Japonica; Mimosa catechu |
| Electuarium acaciae catechu | Electuarium catechu comp. | | Confectio Japonica |
| Tinctura acaciae catechu | Tinctura catechu | Tinctura catechu | Tinctura Japonica |
| Infusum acaciae catechu | | Infusum catechu | Infusum Japonicum |
| Acetum | Acetum vini | Acetum | A. Acetosum; A. aceticum imp. |
| Syrupus aceti | | | Syrupus acetosus |
| Acidum aceticum tenue | Acetum distillatum | Acidum aceticum | |
| Acidum aceticum forte | Acidum aceticum | | Acetum radicale; Spiritus aceti |
| Acidum aceticum aromaticum | | | Acetum prophylacticum |
| Acidum aceticum camphoratum | Acidum aceticum camphoratum | | |
| Acidum aceticum scilliticum | Acetum scillae | Acetum scillae | |
| Acidum benzoicum | Acidum benzoicum | Acidum benzoicum | Flores benzoini, seu benzoes |
| Acidum citricum crystallizatum | Acidum citricum crystallis concretum | Acidum citricum | Acidum limonum |
| Acidum muriaticum | Acidum muriaticum | Acidum muriaticum | Spiritus salis Glauberi, seu fumans |
| | Acidum muriaticum dilutum | | Spiritus salis communis acidus |
| *Acidum oxymuriaticum* | Aqua oxymuriatica | | Chlorine |
| Acidum nitricum | | Acidum nitricum | |
| Acidum nitrosum | Acidum nitrosum | | Spiritus nitri Glauberi, seu fumans |
| Acidum nitrosum dilutum | Acidum nitrosum dilutum | Acidum nitricum dilutum | Aqua fortis simplex |
| Unguentum acidi nitrosi | Unguentum acidi nitrosi | | |
| Acidum succinicum | Acidum succinicum | | |
| Acidum sulphuricum | Acidum sulphuricum | Acidum sulphuricum | Oleum vitrioli |
| Acidum sulphuricum dilutum | Acidum sulphuricum dilutum | Acidum sulphuricum dilutum | Spiritus vitrioli tenuis |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Adeps ovillus | Sevum ovillum | Sevum | Ex ove ariete |
| | | Sevum praeparatum | |
| Adeps suillus | Adeps suillus | Adeps | Axungia porcina ex sue scrofa |
| Adeps praeparatus | Adeps praeparatus | Adeps praeparata | |
| Aloes socotorinae tinctura | Tinctura aloes | Tinctura aloes | Essentia aloes |
| Tinctura aloes aetherea | | | Elixir proprietatis vitriolicum |
| Tinctura aloes et myrrhae | Tinctura aloes composita | Tinctura aloes composita | Elixir proprietatis |
| Vinum aloes socotorinae | Vinum aloes | Vinum aloes | Tinctura sacra. Tinctura Hierae |
| | Pulvis aloes cum guaiaco | Pulvis aloes compositus | Pilulae eccophraticae |
| Althaeae officinalis radix | | Althaeae radix | Bismalva |
| | | Folia althaeae | |
| Syrupus althaeae officinalis | | Syrupus althaeae | |
| Decoctum althaeae officinalis | | | |
| Alumen | Alumen: supersulphas argillae alcalisatae | Alumen | Supersulphas aluminae et potassae |
| Alumen exsiccatum | Alumen ustum | Alumen exsiccatum | |
| Pulvis aluminis compositus | | | Pulvis stypticus |
| | | Liquor aluminis compositus | Aqua aluminosa Bateana |
| Ammoniacum; gummi resina | Ammoniacum | Ammoniacum | Heracleum gummiferum. *Lond.* |
| | Lac ammoniaci | Mistura ammoniaci | |
| Emplastrum ammoniaci | | Emplastrum ammoniaci | |
| | Emplastrum ammoniaci cum hydrar. | Emplas. ammoniaci cum hydrargyro | Emp. ex ammoniaco cum mercurio |
| Alcohol ammoniatum | Spiritus ammoniae | Spiritus ammoniae | Spiritus salis ammoniaci dulcis |
| Tinctura aromatica ammoniata | Spiritus ammoniae aromaticus | Spiritus ammoniae aromaticus | Spiritus volatilis oleosus |
| Tinctura assaefoetidae ammoniatae | Spiritus ammoniae foetidus | Spiritus ammoniae foetidus | Spiritus volatilis foetidus |
| | | Spiritus ammoniae succinatus | *Eau de luce* |
| Amomi repentis semina | Cardamomum minus | Cardamomi semina | Amomum cardamomum. *Dub.* Elettari cardamomum. *Lond.* |
| Tinctura amomi repentis | Tinctura cardamomi minoris | Tinctura cardamomi | |
| | Tinctura cardamomi minoris comp. | Tinctura cardamomi composita | Tinctura stomachica; *Usquebach* |
| Amomi zingiberis radix | Zingiber | Zingiberis radix | Zingiber officinale. *Lond.* |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Tinctura amomi zingiberis | Tinctura zingiberis | Tinctura zingiberis | |
| Syrupus amomi zingiberis | Syrupus zingiberis | Syrupus zingiberis | |
| *Amomum zedoaria* | Zedoaria | | |
| Ammoniae acetatis aqua | Aqua acetatis ammoniae | Liquor ammoniae acetatis | Spiritus Mindereri |
| Murias ammoniae | Sal ammoniacum ; Murias ammoniae | Ammoniae murias | Ammonia muriata |
| | Aqua sulphureti ammoniae | | |
| Hydrosulphuretum ammoniae | Hydrosulphuretum ammoniae | | |
| Amygdalae communis nuclei | Amygdalae dulces | Amygdalae dulces | |
| | | Amygdalae amarae | |
| Oleum amygdalae communis | Oleum amygdalarum | Oleum amygdalarum | |
| | | Confectio amygdalarum | |
| Emulsio amygdalae communis | Lac amygdalae | Mistura amygdalarum | Emulsio communis |
| Amylum | Amylum | Amylum | Ex tritico hyberno |
| Mucilago amyli | Mucilago amyli | Mucilago amyli | |
| Trochisci gummosi | | | Trochisci becchici albi |
| Amyridis Gileadensis resina | | | Balsamum Gileadense |
| *Amyridis elemiferae resina* | Elemi | Elemi | |
| | Unguentum elemi | Unguentum elemi compositum | Balsamum Arcaei |
| Anchusae tinctoriae radix | Anchusa | | |
| Anethi fœniculi semina | Fœniculum dulce | Fœniculi semina | |
| | Oleum essentiale fœniculi dulcis | | |
| | Aqua fœniculi dulcis | Aqua fœniculi | |
| *Anethum graveolens* | | Anethi semina | |
| | | Aqua anethi | Aqua seminum anethi |
| Angelicae archangelicae radix | | | Angelica sativa |
| Anthemidis nobilis flores | Chamaemelum | Anthemidis flores | |
| Extractum anthemidis nobilis | Extractum chamaemeli | Extractum anthemidis | |
| Oleum anthemidis nobilis | | Oleum anthemidis | Oleum chamaemelum |
| Infusum anthemidis nobilis | | Infusum anthemidis | |
| Decoctum anthemidis nobilis | Decoctum chamaemelum compositum | Decoctum malvae compositum | Decoctum commune pro clystere |
| | Enema catharticum | | |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Anthemidis pyrethri radix | Pyrethrum | Pyrethri radix | |
| Antimonii sulphuretum | Sulphuretum antimonii | Antimonii sulphuretum | Stibium |
| Sulph. antimonii praeparatum | Sulphuretum antimonii praeparatum | | Antimonium praeparatum |
| Sulph. antimonii praecipitatum | Sulphur antimoniatum fuscum | Antim. sulphuretum praecipitatum | Sulphur aurat. antim. Kermes minerale |
| Sulph. antim. cum phosphate calcis | Pulvis antimonialis | Pulvis antimonialis | Pulvis Jacobi |
| | Oxydum antimonii nitromuriaticum | Antimonii oxydum | Pulvis Algarothi |
| Tartras antimonii | Tartarum antimoniatum | Antimonium tartarizatum | Tartarus emeticus |
| Vinum tartratis antimonii | | Liquor antimonii tartarizati | Vinum antimoniale |
| Aqua distillata | Aqua distillata | Aqua distillata | |
| Arbutus uvae ursi folia | Uva ursi | Uvae ursi folia | |
| Arctii lappae radix | Bardana | | Lappa major |
| Arctii lappae semina | | | |
| Argentum | Argentum | Argentum | |
| Nitras argenti | Nitras argenti | Argenti nitras | Causticum lunare |
| Aristolochiae serpentariae radix | Serpentaria virginiana | Serpentariae radix | |
| Tinctura aristolochiae serpentariae | Tinctura serpentariae virginianae | Tinctura serpentariae | |
| Arnicae montanae flores | Arnica | | Doronicum Germanicum |
| Radix arnicae montanae | | | |
| Aromaticum electuarium | Electuarium aromaticum | Confectio aromatica | Confectio cardiaca, sive Raleighana |
| Aromaticus pulvis | Pulvis aromaticus | Pulvis cinnamomi compositus | Species aromaticae |
| Arsenici oxidum | Oxydum arsenici album | Arsenici oxydum | Arsenicum album |
| | | Arsenici oxydum sublimatum | |
| | Arsenias kali | | |
| Solutio arsenicalis | | Liquor arsenicalis | Solutio mineralis Fowleri |
| *Artemisia abrotanum* | Abrotanum | | |
| Artemisiae absinthiae folia et summitates florentes | Absinthium vulgare | Absinthium | |
| | Extractum absinthii vulgaris | | |
| *Artemisia maritima* | Absinthium maritimum | | |
| Artemisiae santonicae cacumina | Santonicum | | Semen cinae, seu contra |

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|---|---|---|---|
| *Arum maculatum* | Arum | | Aron |
| Asari Europaei folia | Asarum | Asari folia | |
| Asari pulvis compositus | Pulvis asari compositus | | Pulvis sternutatorius, *seu* cephalicus |
| Astragalae tragacanthae gummi | Tragacantha | Tragacantha | Astragalus verus. *Lond.* |
| Mucilago astragalae tragacanthae | Mucilago tragacanthae | | |
| | | Pulvis tragacanthae compositus | Species diatragacanthae frigidae |
| Aspidii filicis maris radix | Filix mas | Filicis radix | Polypodium filix mas |
| Atropae belladonnae folia | Belladonna | Belladonnae folia | Solanum lethale |
| Succus spissatus atropae belladonnae | | Extractum belladonnae | |
| Avenae sativae semina | | Avenae semina | |
| Farina avenae sativae | | | |
| Barytae carbonas | | | Barytes. Terra ponderosa |
| Murias barytae | | | |
| Solutio muriatis barytae | | | |
| Sulphas barytae | | | Terra pond. vitriol. Spathum pond. |
| Bitumen petroleum | Petroleum Barbadense | Petroleum | Oleum petrae |
| Boletus igniarius | | | Agaricus chirurgorum |
| Bonplandiae trifoliatae cortex | Angustura | Cuspariae cortex | |
| Tinctura bonplandiae trifoliatae | Tinctura angusturae | | |
| | | Infusum cuspariae | |
| Bubonis galbani gummi resina | Galbanum | Galbani gummi resina | |
| | Tinctura galbani | | |
| | | Pilulae galbani compositae | Pilulae gummosae |
| Emplastrum gummosum | Emplastrum galbani | Emplastrum galbani compositum | Emplastrum commune cum gummi |
| Calx | Calx recens usta | Calx | Calx viva |
| Aqua calcis | Aqua calcis | Liquor calcis | Aqua calcis simplex. Solutio calcis |
| Linimentum calcis | Linimentum calcis | | Oleum lini cum calce. *Carron oil.* |
| Carbonas calcis | | | |
| *a mollior;* Creta alba | Creta | Creta | Carbonas calcis friabilis |
| *b durior;* Marmor album | | Lapis calcareus | Carbonas calcis dura |
| *c ex cancro paguro;* Chelae canc. | Chelae cancrorum | | |

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|---|---|---|---|
| *l ex cancro astacho ;* Lapilli canc. | Calculi cancrorum | | Oculi cancrorum. |
| Carbonas calcis praeparatus | Creta praeparata | Creta praeparata | |
| | Creta praecipitata | | |
| Potio carbonatis calcis | Mistura cretae | Mistura cretae | Jalepum e creta. Potio cretacea |
| Trochisci carbonatis calcis | | | Tabellae cardialgicae |
| Pulvis carbonatis calcis compositus | | Pulvis cretae compositus | Pulvis e bolo comp. Pulv. cretaceus |
| | | Pulvis cretae cum opio | Pulvis e bolo comp. cum opio |
| | | Calcis murias | |
| Solutio muriatis calcis | Aqua muriatis calcis | Liquor calcis muriatis | |
| Camphora | Camphora | Camphora | Ex lauro camphora |
| Tinctura camphorae | Spiritus camphoratus | Spiritus camphorae | Spiritus vinosus camphoratus |
| Emulsio camphorae | Mistura camphorata | Mistura camphorae | Julepium e camphora |
| Oleum camphoratum | Oleum camphoratum | Linimentum camphorae | |
| | | Linimentum camphoratum comp. | Linimentum camphorae |
| Canellae albae cortex | Canella alba | Canellae cortex | Costus corticosus |
| Cantharis vesicatoria | Cantharis | Lytta | Lytta vesicatoria |
| Tinctura cantharidis vesicatoriae | Tinctura cantharidis | Tinctura lyttae | |
| Unguent. pulveris canthar. vesicat. | Unguentum cantharidis | Ceratum lyttae | Unguentum epispast. fortius |
| Unguentum infusi canthar. vesicat. | | Unguentum lyttae | Unguentum epispast. mitius |
| Emplastrum cantharidis vesicat. | Emplastrum cantharidis | Emplastrum lyttae | Emplastrum vesicatorium |
| Emplastum canth. vesicat. comp. | | | |
| Capsici annui fructus | Capsicum | Capsici baccae | Piper Indicum |
| | | Tinctura capsici | |
| Carbo ligni | Carbo ligni | Carbo ligni | |
| Cardamines pratensis flores | Cardamine | Cardamines flores | |
| Cari carui semina | Caruon | Carui semina | Carvi |
| Spiritus cari carui | Spiritus carui | Spiritus carui | Aqua carvi spirituosa |
| | Oleum essentiale carui | Oleum carui | |
| | | Aqua carui | |
| Cassiae fistulae fructus | Cassia fistularis | Cassiae pulpa | Diacasia |
| Electuarium cassiae fistulae | Electuarium cassiae | Confectio cassiae | Electuarium e cassia |

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|---|---|---|---|
| Cassiae sennae folia | Senna | Sennae folia | |
| Tinctura sennae composita | Tinctura sennae | Tinctura sennae | Elixir salutis |
| Electuarium cassiae sennae | Electuarium sennae | Confectio sennae | Electuarium lenitivum |
| Syrupus cassiae sennae | Syrupus sennao | Syrupus sennae | |
| Infusum sennae compositum | Infusum sennae | Infusum sennae | Infusum sennae commune |
| | | Pulvis sennae compositus | Pulvis diasenae |
| Castor fiber; Castoreum | Castoreum Rossicum | Castoreum | |
| Tinctura castorei | Tinctura castorei Rossici | Tinctura castorei | |
| Tinctura castorei composita | | | |
| | Castorium Canadense | | |
| | Tinctura castorei Canadensis | | |
| Centaureae benedictae herba | Carduus benedictus | | Acanthus Germanicus |
| Cera alba | Cera alba | Cera alba | Apis mellifica |
| Linimentum simplex | | | |
| Unguentum simplex | Unguentum cerae albae | | Unguentum album |
| Cera flava | Cera flava | Cera flava | |
| | Cera flava purificata | | |
| Ceratum simplex | Unguentum cerae flavae | Ceratum simplex | |
| Emplastrum simplex | | Emplastrum cerae | Emplastrum attrahens |
| Cerevisiae fermentum | | Cerevisiae fermentum | |
| | | Cataplasma fermenti | |
| Cervae elaphi cornu | Cornu cervinum | Cornua | |
| | | Cornu ustum | Phosphas calcis |
| | Pulvis cornu cervini usti | Mistura cornu usti | Decoctum album |
| | | Pulvis cornu usti cum opio | Pulvis opiatus |
| | Decoctum cornu cervini | | |
| | Liquor volatilis cornu cervini | | Spiritus cornu cervi fœtidum |
| | Oleum cornu cervini | | Oleum cornu cervi |
| | Oleum rectificatum cornu cervini | | Oleum e cornibus |
| Chironiae centaurii summitates | Centaureum minus | Centaurii cacumina | |
| Cinchonae lancifoliae cortex | Cinchona; Cortex Peruvianus | Cinchonae lancifoliae cortex | Cortex Peruvianus pallidus |

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|---|---|---|---|
| Cinchonae cordifoliae cortex | | Cinchonae cordifoliae cortex | Cortex Peruvianus flavus |
| Cinchonae oblongifoliae cortex | | Cinchonae oblongifoliae cortex | Cortex Peruvianus ruber |
| Decoctum cinchonae lancifoliae | Decoctum corticis cinchonae | Decoctum cinchonae | |
| | Extractum cinchonae molle | Extractum cinchonae molle | |
| | Extractum cinchonae durum | Extractum cinchonae durum | |
| Extractum cinchonae lancifoliae | Extractum cinchonae rubrae resinos. | Extractum cinchonae resinosum | |
| Infusum cinchonae lancifoliae | Infusum cinchonae sine calore | Infusum cinchonae | |
| Tinctura cinchonae lancifoliae | Tinctura cinchonae | Tinctura cinchonae | |
| Tinctura cinchonae composita | Tinctura cinchonae composita | Tinctura cinchonae composita | *Huxham's Tincture of bark* |
| Citri aurantii succus | Aurantium Hispalense | Aurantii baccae | Mala aurantia |
| Cortex citri aurantii | | Aurantii cortex | |
| Aqua citri aurantii | | | |
| | | Infusum aurantii compositum | |
| Conserva citri aurantii | Conserva aurantii | Confectio aurantiorum | Conserva flavedinis cort. aur. |
| | Tinctura aurantii | Tinctura aurantii | Tinctura corticis aurantii |
| Syrupus citri aurantii | Syrupus aurantii | Syrupus aurantiorum | Syrupus e corticibus aurantiorum |
| Citri medicae fructus | Limonum | Limones | |
| Oleum volatile citri medicae | | Limonum oleum | |
| Cortex citri medicae | | Limonum cortex | |
| Aqua citri medicae | | | |
| Syrupus citri medicae | Syrupus limonum | Syrupus limonum | Syrupus e succo citriorum |
| Coccus cacti | Coccinella | Coccus | |
| Cochleariae armoraciae radix | Raphanus rusticanus | Armoraciae radix | |
| | Spiritus raphani compositus | Spiritus armoraciae compositus | Aqua raphani composita |
| | | Infusum armoraciae compositum | |
| Coci butyraceae oleum fixum | | | Oleum palmae |
| Colchici autumnalis radix | Colchicum | Colchici radix | |
| | Oxymel colchici | | |
| Syrupus colchici autumnalis | | | |
| | | Acetum colchici | |
| Colombae radix | Colombo | Calumbae radix | |

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|---|---|---|---|
| Infusum colombae | | Infusum calumbae | |
| Tinctura colombae | Tinetura colombo | Tinctura calumbae | |
| Conii maculati folia | Cicuta | Conii folia | |
| Succus spissatus conii maculati | Succus spissatus cicutae | Extractum conii | |
| Tinctura conii maculati | | | |
| Convolvuli scammoniae gummi-resina | Scammonium | Scammoneae gummi resina | Diagrydium |
| Pulvis scammoniae compositus | | Pulvis scammoneae compositus | Pulvis comitis Warwicensis |
| | Electuarium scammonii | Confectio scammoneae | Electuarium caryocostinum |
| Convolvuli jalapae radix | Jalapa | Jalapa | Mechoacanna nigra |
| Extractum convolvuli jalapae | Extractum jalapae | Extractum jalapae | Extractum jalapii |
| | Extractum jalapae resinosum | | |
| Tinctura convolvuli jalapae | Tinctura jalapae | Tinctura jalapae | Tinctura jalapii |
| Pulvis jalapae compositus | | | |
| Copaiferae officinalis resina | Balsamum copaibae | Copaiba | Balsamum Brasiliense |
| Coriandri sativi semina | Coriandrum | Coriandri semina | |
| Croci sativi stigmata | Crocus | Croci stigmata | Crocus Anglicus |
| | | Syrupus croci | |
| Tinctura croci | Tinctura croci | | |
| Crotonis eleutheriae cortex | Cascarilla | Cascarillae cortex | Croton cascarilla. *Dub. Lond.* Clutia eleutheria. *Linn.* |
| Tinctura crotonis eleutheriae | Tinctura cascarillae | Tinctura cascarillae | |
| | Extractum cascarillae resinosum | | |
| | | Infusum cascarillae | |
| Cucumeris colocynthidis pulpa | Colocynthis | Colocynthidis pulpa | |
| | | Extractum colocynthidis | |
| | Extractum colocynthidis comp. | Extractum colocynthidis comp. | Extractum catharticum. Pil. rudii |
| Pilulae colocynthidis compositae | Pilulae colocynthidis compositae | | |
| *Cuminum cyminum* | | Cumini semina | |
| | | Emplastrum cumini | Emplastrum e cymino |
| *Cuprum* | Cuprum | | Aes |

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|---|---|---|---|
| Subacetas cupri | Ærugo, subacetas cupri | Ærugo | Viride aeris |
| | Ærugo praeparata | | |
| | Oxymel aeruginis | Linimentum aeruginis | Mel Ægyptiacum |
| Unguentum subacetatis cupri | Unguentum aeruginis | | |
| Ammoniaretum cupri | Cuprum ammoniatum | Cuprum ammoniatum | Cuprum ammoniacum |
| Pilulae ammoniareti cupri | | | |
| | Aqua cupri ammoniati | Liquor cupri ammoniati | Aqua saphirina |
| Sulphas cupri | Sulphas cupri | Cupri sulphas | Cuprum vitriol. Vitr. coeruleum |
| Solutio sulphatis cupri composita | | | Aqua styptica |
| Daphnes mezerei cortex | Mezereum | Mezerei cortex | Laureola ; Cocognidium |
| Decoctum daphnes mezerei | | | |
| Daturae stramoniae herba | Stramonium | | |
| Dauci carotae radix | Dauci sylvestris semina | Dauci semina | Carota |
| | | Dauci radix | |
| Delphinii staphisagriae semina | Staphisagria | Staphisagriae semina | |
| Dianthi caryophylli flores | Caryophyllum rubrum | | Caryophylla rubra |
| Syrupus dianthi caryophilli | Syrupus caryophyllum | | |
| Digitalis purpureae folia | Digitalis | Digitalis folia | |
| | Decoctum digitalis | | |
| Tinctura digitalis purpureae | Tinctura digitalis | Tinctura digitalis | |
| Infusum digitalis purpureae | | Infusum digitalis | |
| Dolichi prurientis pubes | Dolichos | Dolichi pubes | |
| Dorsteniae contrajervae radix | | Contrajervae radix | |
| | | Pulvis contrajervae comp. | Lapis contrayervae |
| *Eryngium maritimum* | Eryngium | | |
| Eugeniae caryophyllatae flores | Caryophylli aromaticae | Caryophylli | |
| Oleum volatile eugeniae caryophyl. | Oleum essentiale caryoph. aromat. | Caryophyllorum oleum | |
| | | Infusum caryophyllorum | |
| *Euphorbii officinalis gummi resina* | | Euphorbiae gummi resina | |
| Ferri fila | Ferrum | Ferrum | Chalybs |
| Limatura ferri | | | |

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|---|---|---|---|
| Limatura ferri purificata | | | Ferrum alcoholisatum |
| Oxidum ferri nigrum | | | Squamae ferri |
| Oxidum ferri nigrum purificatum | Oxydum ferri nigrum | | Squamae ferri purificatae |
| Carbonas ferri praecipitatus | Carbonas ferri | Ferri subcarbonas | |
| Subcarbonas ferri praeparatus | Rubigo | | Chalybis rubigo praeparata |
| Sulphas ferri | Sulphas ferri | Ferri sulphas | Sal martis. Vitriol. viride. Sal chalyb. |
| Sulphas ferri exsiccatus | Sulphas ferri exsiccatum | | Vitroleum calcinatum |
| Pilulae sulphatis ferri comp. | | | |
| | | Mistura ferri composita | |
| | | Pilulae ferri compositae | |
| Oxidum ferri rubrum | Oxydum ferri rubrum | | Colcothar vitrioli |
| Emplastrum oxidi ferri rubri | Emplastrum thuris | | Emplastrum roborans |
| Tinctura muriatis ferri | Tinctura muriatis ferri | Tinctura ferri muriatis | Tinctura martis in spiritu salis |
| | Tinctura muriatis cum oxydo rubro | | Tinctura martis aurea |
| Murias ammoniae et ferri | Murias ammoniae et ferri | Ferrum ammoniatum | Flores martiales. Ens veneris |
| | | Tinctura ferri ammoniati | Tinctura martis Mynsichti |
| Tartras potassae et ferri | Tartarum ferri | Ferrum tartarizatum | Mars solubilis. Tartarus martialis |
| | Vinum ferri | Vinum ferri | Vinum chalybeatum. Vin. martis |
| | Acetas ferri | | Extractum martis |
| | Tinctura acetatis ferri | | |
| | Tinctura acetatis ferri cum alcohol | | |
| Sulphuretum ferri | Sulphuretum ferri | | |
| | | Liquor ferri alkalini | Tinctura martis alkalina |
| Ferulae assae foetidae gummi resina | Assa fœtida | Assae fœtidae gummi resina | |
| | Lac assae fœtidae | Mistura assafœtidae | |
| Tinctura ferulae assae foetidae | Tinctura assae fœtidae | Tinctura assafœtidae | Tinctura foetida |
| | Enema fœtidum | | |
| Pilulae ferulae assae foetidae comp. | Pilulae myrrhae compositae | | Pilulae gummosae |
| Emplastrum ferulae assae fœtidae | | | Emplastrum antihystericum |
| Fici caricae fructus | Carica | Caricae fructus | |
| *Fucus vesiculosus* | Quercus marina | Fucus | |

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|---|---|---|---|
| | Querci marinae pulvis | | Æthiops vegetabilis |
| Gallae | Gallae | Galla | Cynipidum quercus folli nidi |
| Tinctura gallarum | Tinctura gallarum | | |
| Gambogiae gummi resina | Gambogia | Gambogia | { Stalagmitis gambogioides, *L.D.* |
| Pilulae gambogiae compositae | | Pilulae gambogiae compositae | { Gummi guttae |
| Gentianae luteae radix | Gentiana | Gentianae radix | Gentiana rubra |
| Extractum gentianae | Extractum gentianae | Extractum gentianae | |
| Infusum gentianae compositum | Infusum gentianae compositum | Infusum gentianae compositum | Infusum amarum simplex |
| Tinctura gentianae composita | Tinctura gentianae composita | Tinctura gentianae composita | Tinctura amara, Elixir stomachicum |
| Vinum gentianae compositum | | | Vinum amarum |
| Geoffraeae inermis cortex | Geoffrœa | | Geoffroya inermis. *Dub.* |
| Decoctum geoffraeae inermis | | | |
| *Geum urbanum* | Geum urbanum | | Caryophyllata |
| Glycyrrhizae glabrae radix | Glycyrrhiza | Glycyrrhizae radix | Radix liquiritiae |
| Extractum glycyrrhizae glabrae | Extractum glycyrrhizae | Extractum glycyrrhizae | Succus liquiritiae depuratus |
| Trochisci glychirrhizae glabrae | | | Trochisci becchici nigri |
| Trochisci glycyr. glabrae cum opio | | | |
| Gratiolae officinalis herba | Gratiola | | |
| Guiaiaci officinalis lignum | Guaiacum | Guaiaci lignum | Lignum sanctum |
| Resina guaiaci officinalis | | Guaiaci resina | |
| Tinctura guaiaci officinalis | Tinctura guaiaci | Tinctura guaiaci | Elixir guaiacinum |
| Tinctura guaiaci officinalis ammon. | Tinctura guaiaci ammoniata | Tinctura guaiaci ammoniata | Elixir guaiacinum volatile |
| Decoctum guaiaci compositum | Aqua calcis composita | | Decoctum lignorum |
| | | Mistura guaiaci | Lac guaiaci |
| Haematoxyli campechiani lignum | Haematoxylum | Haematoxyli lignum | Lignum Campechense |
| Extractum haematoxyli campech. | Extractum haematoxyli campechiani | Extractum haematoxyli | Extractum ligni Campechensis |
| Hellebori nigri radix | Helleborus niger; Melampodium | Hellebori nigri radix | Melampodium |
| Extractum helleboris nigri | Extractum helleboris nigri | | Extractum melampodii |
| Tinctura helleboris nigri | Tinctura hellebori nigri | Tinctura hellebori nigri | Tinctura melampodii |
| *Helleborus foetidus* | Helleboraster | Hellebori fœtidi folia | |
| *Hirudo medicinalis* | Hirudo medicinalis | | |

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|---|---|---|---|
| Hordei distichi semina | Hordeum distichum | Hordei semina | |
| Decoctum hordei | Decoctum hordei | Decoctum hordei | Aqua hordeata |
| | Decoctum hordei compositum | Decoctum hordei compositum | Decoctum pectorale |
| Humuli lupuli strobili | | Humuli strobili | |
| | | Extractum humuli | Extractum lupuli |
| Tinctura humuli lupuli | | Tinctura humuli | |
| Hydrargyrus | Hydrargyrum | Hydrargyrum | Argentum vivum ; Mercurius |
| Hydrargyrus purificatus | Hydrargyrum purificatum | Hydrargyrum purificatum | |
| Pilulae hydrargyri | Pilulae hydrargyri | Pilulae hydrargyri | Pilulæ cœruleae |
| Emplastrum hydrargyri | | Emplastrum hydrargyri | Emp. lithargyri cum hydrargyro |
| Unguentum hydrargyri | Unguentum hydrargyri | Unguentum hydrargyri fortius | Unguentum cœruleum fortius |
| | Unguentum hydrargyri mitius | Unguentum hydrargyri mitius | Unguentum cœruleum mitius |
| | | Linimentum hydrargyri | |
| | Hydrargyrum cum magnesia | | |
| | Hydrargyrum cum creta | Hydrargyrum cum creta | Mercurius alkalisatus |
| Acetas hydrargyri | Acetas hydrargyri | | |
| Murias hydrargyri corrosivus | Murias hydrargyri corrosivum | Hydrargyri oxymurias | Mercurius corrosivus sublimatus |
| | | Liquor hydrargyri oxymuriatis | Liquor Bellostii |
| Submurias hydrargyri mitis | Submurias hydrargyri sublimatum | Hydrargyri submurias | Calomelas. Panacea merc. |
| Pilulae submuriatis hydrar. comp. | | Pilulae hydrargyri submuriatis comp. | Pilulae Plummeri |
| Submurias hydrargyri praecipitatus | Submurias hydrargyri praecipitatum | | Hydrargyrus praecipitatus dulcis |
| | Submurias hydrargyri ammoniatum | Hydrargyrum praecipitatum album | Mercurius cosmeticus |
| | Submurias hydrargyri unguentum | Unguent. hydrargyri præcipitati albi | Unguentum e mercurio praecip. |
| Oxidum hydrargyri cinereum | Pulvis hydrargyri cinereus | Hydrargyri oxidum cinereum | Mercurius solubilis |
| Unguentum oxidi hydrargyri cinerei | | | |
| | Oxydum hydrargyri | Hydrargyri oxidum rubrum | Mercurius calcinatus |
| Oxidum hydrargyri rubrum per acidum nitricum | Oxydum hydrargyri nitricum | Hydrargyri nitrico-oxydum | Mercurius praecipitatus ruber |
| Unguentum oxidi hydrargyri rubri | Unguentum subnitratis hydrargyri | Unguentum hydrargyri nitrico-oxydi | |
| Unguent. nitratis hydrarg. fortius | Unguentum supernitratis hydrargyri | Unguentum hydrargyri nitratis | Unguentum citrinum |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Unguentum nitratis hydrar. mitius | | | |
| Subsulphas hydrargyri flavus | Oxydum hydrargyri sulphuricum | | Turpethum miner. Merc. emet. flav. |
| Sulphuretum hydrargyri nigrum | Sulphuretum hydrargyri nigrum | Hydrargyri sulphuretum nigrum | Æthiops mineralis; Pulv. hypnoticus |
| Hydrargyri sulphuretum rubrum | Sulphuretum hydrargyri rubrum | Hydrargyri sulphuretum rubrum | Cinnabaris factitia |
| Hyosciami nigri herba | Hyosciamus | Hyosciami folia | |
| Semina hyosciami nigri | | Semina hyosciami | |
| Succus spissatus hyosciami nigri | Succus spissatus hyosciami | Extractum hyosciami | |
| Tinctura hyosciami nigri | Tinctura hyosciami | Tinctura hyosciami | |
| Hyssopus officinalis herba | Hyssopus | | |
| *Inula helenium* | Enula campana | | |
| Ipecacuanha ; radix | Ipecacuanha | Ipecacuanhae radix | Calicocca *or* Cephaëlis ipecacuanha |
| Pulvis ipecacuanhae et opii | Ipecacuanhae pulvis compositus | Pulvis ipecacuanhae compositus | Pulvis Doveri |
| Vinum ipecacuanhae | Vinum ipecacuanhae | Vinum ipecacuanhae | |
| Iris Florentinae radix | | | Orris |
| Juniperi communis bacca | Juniperus | Juniperi baccae | |
| | | Juniperi cacumina | |
| Spiritus juniperi compositus | Spiritus compositus juniperi | Spiritus juniperi compositus | Aqua juniperi composita |
| Oleum volatile juniperi commun. | Oleum essentiale juniperi | Oleum juniperi | |
| Juniperi lyciae gummi resina | Olibanum | Olibanum | Thus |
| Juniperi sabinae folia | Sabina | Sabinae folia | |
| Oleum volatile juniperi sabinae | Oleum essentiale sabinae | | |
| | Extractum sabinae | | |
| Ceratum juniperi sabinae | Unguentum sabinae | Ceratum sabinae | |
| Kino ; succus concretus | Kino | Kino | Eucalyptus resinifera, *Ed.*;<br>Butea frondosa, *Dub.* |
| Tinctura kino | Tinctura kino | Tinctura kino | |
| | | Pulvis kino compositus | |
| Lactucae virosae herba | | | Lactuca sylvestris |
| Succus spissatus lactucae virosae | | | |
| Lactucae sativae herba | | | |
| Succus spissatus lactucae sativae | | | Succus concretus lactucae sativae |
| Lactucarium | | | |

| EDINBURGH. | DUBLIN | LONDON. | VARIOUS. |
|---|---|---|---|
| Lavandulae spicae flores | Lavandula | Lavandulae flores | |
| Spiritus lavandulae spicae | Spiritus lavandulae | Spiritus lavandulae | Spiritus lavand. simp. |
| Spiritus lavandulae compositus | Spiritus lavandulae compositus | Spiritus lavandulae compositus | |
| Oleum volatile lavandulae spicae | Oleum essentiale lavandulae spicae | Oleum lavandulae | Oleum spicae |
| Lauri cassiae cortex | Cassia lignea | | Xylocassia. Can. Malab. |
| Flores lauri cassiae | | | |
| Aqua lauri cassiae | | | |
| Lauri cinnamomi cortex | Cinnamomum | Cinnamomi cortex | Canella |
| Aqua lauri cinnamomi | Aqua cinnamomi | Aqua cinnamomi | Aqua cinnamomi simplex |
| | | Cinnamomi oleum | |
| Spiritus lauri cinnamomi | Spiritus cinnamomi | Spiritus cinnamomi | Aqua cinnamomi spirituosa |
| Tinctura lauri cinnamomi | Tinctura cinnamomi | Tinctura cinnamomi | |
| Tinctura cinnamomi comp. | Tinctura cinnamomi composita | Tinctura cinnamomi composita | Tinctura aromatica |
| Lauri nobilis bacca | | Lauri baccae | |
| | | Lauri folia | |
| Oleum expressum lauri nobilis | | | |
| Lauri sassafras lignum | Sassafras | Sassafras lignum | |
| Radix lauri sassafras | | Sassafras radix | |
| Oleum volatile lauri sassafras | Oleum essentiale sassafras | | |
| Leontodi taraxaci radix | Taraxacum | Taraxaci radix | Dens leonis |
| Herba leontodi taraxaci | | | |
| | Extractum taraxaci | Extractum taraxaci | |
| Lichen Islandicus | Lichen Islandicus | Lichen | Muscus Islandicus |
| Decoctum lichenis Islandici | Decoctum lichenis Islandici | Decoctum lichenis | |
| *Lichen rocella* | Litmus | | Lacmus tinctorius |
| Lini usitatissimi semina | Linum | Lini usitatissimi semina | |
| Oleum lini usitatissimi | Oleum lini | Oleum lini | |
| Infusum lini usitatissimi | | Infusum lini | |
| *Linum catharticum* | Linum catharticum | Linum catharticum | |
| *Lythrum salicaria* | Lythrum salicaria | | |
| Magnesia | Magnesia usta | Magnesia | |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
| --- | --- | --- | --- |
| Magnesiae carbonas | Magnesia | Magnesiae carbonas | |
| Sulphas magnesiae | Sulphas magnesiae | Magnesiae sulphas | Sal catharticum amarum |
| Malvae silvestris herba | | Malva | |
| Flores malvae silvestris | | | |
| | | Decoctum malvae compositum | Anthemidis nobilis decoctum, *Ed.* |
| *Manganesium* | Manganesium | | Magnesia vitrariorum |
| Manna | Manna | Manna | Succus concretus fraxini orni |
| Mel | Mel | Mel | |
| Mel despumatum | Mel despumatum | Mel despumatum | |
| Oxymel | Oxymel | Oxymel simplex | |
| Marrubii vulgaris herba | Marrubium album | Marrubium | |
| Melaleucae leucadendri oleum volat. | Oleum cajeput | Cajuputi oleum | Melaleuca cajuputi. *Lond.* |
| Melissae officinalis folia | | | |
| Menispermi cocculi baccae | | | |
| Menthae piperitae herba | Mentha piperitis | Mentha piperita | |
| Aqua menthae piperitae | Aqua menthae piperitidis | Aqua menthae piperitae | Aqua menth. pip. simplex |
| Spiritus menthae piperitae | | Spiritus menthae piperitae | Aqua menth. pip. spirituosa |
| Oleum volatile menthae piperitae | Oleum essentiale menthae piperitidis | Oleum menthae piperitae | |
| Menthae pulegii herba | Pulegium | Pulegium | |
| Aqua menthae pulegii | Aqua pulegii | Aqua pulegii | |
| | Oleum essentiale pulegii | Oleum pulegii | |
| | | Spiritus pulegii | |
| *Mentha viridis* | Mentha sativa | Mentha viridis | |
| | Oleum essentiale menthae sativae | Oleum menthae viridis | Aqua menthae vulgaris simplex |
| | Aqua menthae sativae | Spiritus menthae viridis | Aqua menthae vulgaris spirituosa |
| | Infusum menthae compositum | | |
| Menyanthis trifoliatae folia | Trifolium paludosum | Menyanthes | Trifolium palustre |
| *Memordica elaterium* | Cucumis agrestis | Elaterii poma | |
| Momordicae elaterii succus spissatus | Elaterium | Extractum elaterii | |
| *Morus nigra* | | Morus | |
| | | Syrupus mori | |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Moschus | Moschus | Moschus | Ex moscho moschifero |
| | Tinctura moschi | | |
| | | Mistura moschi | Julepum e moscho |
| Myristicae moschatae nucleus | Nux moschata | Myristicae nuclei | Myristicae mosch. involucrum nuclei |
| Spiritus myristicae moschatae | Nucis moschatae spiritus | Spiritus myristicae | Aqua nucis moschatae spirituosa |
| Macis | | | |
| Myroxyli Peruiferi balsamum | Balsamum Peruvianum | Balsamum Peruvianum | Balsamum Indicum nigrum |
| Myrrhae gummi resina | Myrrha | Myrrha | |
| Tinctura myrrhae | Tinctura myrrhae | Tinctura myrrhae | |
| Myrti pimentae fructus | Pimento; Piper Jamaicense | Pimentae baccae | Piper Jamaicense |
| Aqua myrti pimentae | Aqua pimenti | Aqua pimentae | Aqua pimentae simplex |
| Spiritus myrti pimentae | Spiritus pimenti | Spiritus pimentae | Aqua pimentae spirituosa |
| Oleum volatile myrti pimentae | Oleum essentiale pimenti | Oleum pimentae | |
| Nicotianae tabaci folia | Nicotiana | Tabaci folia | |
| Vinum nicotianae tabaci | | | |
| | | Infusum tabaci | |
| Oleae Europaeae oleum fixum | Oleum olivarum | Olivae oleum | |
| *Oniscus asellus* | Millepedae | | |
| Opium | Opium | Opium | |
| | Opium purificatum | | |
| | Extractum opii aquosum | Extractum opii | Extract. thebaicum. Opium colatum |
| Tinctura opii | Tinctura opii | Tinctura opii | Tinctura thebaica. Laudan. liquidum |
| Tinctura opii ammoniata | | | Elixir paregoricum. *Ed.* |
| Tinctura opii camphorata | Tinctura opii camphorata | Tinctura camphorae composita | Elixir paregor. Anglorum. *L. Dub.* |
| Tinctura saponis et opii | | | Linimentum anodynum |
| | Syrupus opii | | |
| Emplastrum opii | | Emplastrum opii | |
| Vinum opii | | Vinum opii | Laudanum liquidum Sydenhami |
| Electuarium opiatum | | Confectio opii | Philonium London. Elect. thebaicum |
| Pilulae opiatae | Pilulae e styrace | Pilulae saponis cum opio | Pilulae thebaicae |
| Pulvis opiatus | | | |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Origani majoranae herba | Majorana | | |
| *Origanum vulgare* | Origanum | Origanum | |
| Oleum origani majoranae | Oleum essentiale origani | Oleum origani | |
| *Ostrea edulis* | | Testae | |
| | Ostrearum testae praeparatae | Testae praeparatae | |
| *Oxalis acetosella* | | Acetosella | Lujula |
| Papaveris somniferi capsulae | Papaver album | Papaveris capsulae | |
| Extractum papaveris somniferi | | Extractum papaveris | |
| Syrupus papaveris somniferi | Syrupus papaveris albi | Syrupus papaveris | Syrupus diacodion ; Syr. e meconio |
| | | Decoctum papaveris | D. pro fomento. Fotus communis |
| *Papaver rhoeas* | Papaver erraticum | Rhoeados petalla | |
| | Syrupus papaveris erratici | Syrupus rhoeados | |
| *Pastinacae opoponacis gummi resina* | | Opoponacis gummi resina | |
| Pimpinellae anisi semina | Anisum | Anisi semina | |
| Oleum volatile pimpinellae anisi | Oleum essentiale anisi | Oleum anisi | |
| | Spiritus anisi compositus | Spiritus anisi | |
| Pini balsameae resina | Balsamum Canadense | Terebinthina Canadense | |
| Terebinthina veneta | Terebinthina veneta | | ex pino larice |
| Terebinthina vulgaris | Terebinthina vulgaris | Terebinthina vulgaris | ex pino sylvestre |
| | | Linimentum terebinthinae | |
| Oleum volatile pini | Oleum terebinthinae | Terebinthinae oleum | ex variis pinis |
| Oleum pini purissimum | Oleum terebinthinae rectificatum | Oleum terebinthinae rectificatum | Oleum terebinthinae aethereum |
| | | Abietis resina | Thus; Resina concreta |
| | Emplastrum aromaticum | | Emplastrum cephalicum |
| Pix Burgundica | Pix Burgundica | Pix arida | |
| | | Unguentum picis aridae | |
| | | Emplastrum picis compositum | Emplastrum picis Burgundicae |
| Resina alba | Resina flava : Resina alba | Resina flava | Colophonium ; Resina praeparata |
| Unguentum resinosum | Unguentum resinae albae | Ceratum resinae | Unguentum basilicum flavum |
| Emplastrum resinosum | Emplastrum lithargyri cum resina | Emplastrum resinae | Emplastrum adhaesivum |
| Pix liquida | Pix liquida | Pix liquida | *Tar.* Resina empyreumatica |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Unguentum picis | Unguentum picis liquidae | Unguentum picis liquidae | |
| | | Resina nigra | *Pitch* |
| | | Unguentum resinae nigrae | |
| Piperis longi fructus | Piper longum | Piperis longi fructus | |
| Piperis nigri fructus | Piper nigrum | Piperis nigri baccae | |
| | Unguentum piperis nigri | | |
| *Pistacia terebinthus* | | Terebinthina Chia | |
| Pistaciae lentisci resina | | Mastiche | |
| Plumbi acetas | Acetas plumbi | Superacetas plumbi | Saccharum saturni |
| Unguentum acetatis plumbi | Unguentum acetatis plumbi | Ceratum plumbi superacetatis | Unguentum saturninum |
| | Liquor subacetatis lithargyri | Liquor plumbi subacetatis | Extractum saturni |
| | | Liquor plumbi dilutus | |
| | | Ceratum plumbi compositum | |
| | Liquor subacet. plumbi comp. | | |
| Carbonas plumbi | Cerussa ; subacetas plumbi | Plumbi subcarbonas | Oxidum plumbi album |
| Unguentum carbonatis plumbi | Unguentum cerussae | | Unguentum album |
| Oxidum plumbi semivitreum | Lithargyrum | Oxydum plumbi semivitreum | Plumbum ustum |
| Emplastrum oxid. plumb. semivit. | Emplastrum lithargyri | Emplastrum plumbi | Diachylon simplex |
| Oxidum plumbi rubrum | | | Plumbum ustum rubrum |
| Polygalae senegae radix | Seneka | Senegae radix | |
| Decoctum polygalae senegae | | Decoctum senegae | |
| Polygoni bistortae radix | Bistorta | Bistortae radix | |
| Potassa | Kali causticum | Potassa fusa | Lapis infernalis *sive* septicus |
| Potassa cum calce | Kali causticum cum calce | Potassa cum calce | Causticum commune mitius |
| Aqua potassae | Aqua kali caustici | Liquor potassae | Sal diureticus |
| Acetas potassae | Acetas kali | Acetas potassae | Lixivium saponarium causticum |
| Carbonas potassae | | Carbonas potassae | |
| Subcarbonas potassae | Subcarbonas kali | Subcarbonas potassae | Sal absinthii |
| Subcarbonas potassae purissimus | Subcarbonas kali e tartaro | Subcarbonas potassae ex tartaro | Sal tartari |
| Subcarbonas potassae impurus | Cineres clavellati ; Kali impurum | Potassa impura | Alkali fixum vegetabile |
| | Aqua subcarbonatis kali | Liquor potassae subcarbonatis | Oleum tartari per deliquium |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Aqua super-carbonatis potassae | | | |
| Nitras potassae | Nitrum ; nitras kali | Potassae nitras | Nitrum prismaticum |
| Trochisci nitratis potassae | | | |
| Sulphas potassae | Sulphas kali | Potassae sulphas | Sal de duobus. Arcanum duplicatum |
| Sulphas potassae cum sulphure | | | Sal polychrestus Glauberi |
| | | Potassae supersulphas | |
| Sulphuretum potassae | Sulphuretum kali | Potassae sulphuretum | Hepar sulphuris |
| | Aqua sulphureti kali | | |
| Supertartras potassae | Crystalli tartari | Potassae supertartras | Tartarus purificatus |
| Supertartras potassae impurus | Tartarum | Tartarum | Tartarus crudus |
| Tartras potassae | Tartaras kali | Potassae tartras | Tartarum solubile |
| | Aqua alkalina oxymuriatica | | |
| Pruni domesticae fructus | Prunus Gallica | Pruna (drupae siccatae) | |
| Pterocarpus | | | |
| Pterocarpi santalini lignum | Santalum rubrum | Pterocarpi lignum | |
| *Punicae granati fructus cortex* | Granatum | Granati cortex | |
| *Pyrus cydonia* | | Cydoniae semina | Cotonea |
| | | Decoctum cydoniae | Mucilago cydoniorum |
| Quassiae excelsae lignum | Quassia | Quassiae lignum | |
| Tinctura quassiae excelsae | Tinctura quassiae | | |
| Infusum quassiae excelsae | | Infusum quassiae | |
| Quassiae simarubae cortex | Simarouba | Simaroubae cortex | |
| | | Infusum simaroubae | |
| Quercus roboris cortex | Quercus | Quercus cortex | Quercus pedunculata. *Lond.* |
| Decoctum quercus roboris | | Decoctum quercus | |
| | Extractum quercus | | |
| Rhamni cathartici succus | Rhamnus catharticus | Rhamni baccae | Spina cervina |
| Syrupus rhamni cathartici | | Syrupus rhamni | Syrupus domesticus |
| Rhei radix | Rheum | Rhei radix | Rhabarbarum |
| Tinctura rhei | Tinctura rhei | Tinctura rhei | Tinctura rhabarbari spirituosa |
| Tinctura rhei et aloes | | | Elixir sacrum |

| EDINBURGH. | DUBLIN. | LONDON: | VARIOUS. |
|---|---|---|---|
| Tinctura rhei et gentianae | | | Tinctura rhoei amara |
| | | Tinctura rhei composita | |
| Infusum rhei | | Infusum rhei | |
| Vinum rhei | | | Tinctura rhabarbari vinosa |
| Pilulae rhei compositae | | | Pilulae stomachicae |
| | | Extractum rhei | Extractum rhei aquosum |
| *Rheum undulatum* | Rheum undulatum | | |
| Rhododendri chrysanthi folia | | | |
| Rhois toxicodendri folia | | Toxicodendri folia | Toxicodendron |
| *Ricinus communis semina* | Ricinus | Ricini semina | Palma christi. Cataputia major |
| Oleum fixum ricini communis | | Oleum ricini | Oleum de kerva. Ol. palmae liquidum |
| Rosae caninae fructus | | Rosae caninae pulpa | Cynosbatus |
| Conserva rosae caninae | | Confectio rosae caninae | Conserva fructus cynosbati |
| Rosae centifoliae petala | Rosa damascena | Rosae centifoliae petala | Rosa pallida |
| Aqua rosae centifoliae | Aqua rosae damascenae | Aqua rosae | |
| Syrupus rosae centifolia | | Syrupus rosae | Syrupus rosarum solutivus |
| Rosae Gallicae petala | Rosa rubra | Rosae Gallicae petala | |
| Mel rosae gallicae | Mel rosae rubrae | Mel rosae | Mel rosaceum |
| Conserva rosae gallicae | Conserva rosae rubrae | Confectio rosae Gallicae | |
| Infusum rosae gallicae | Infusum rosae rubrae | Infusum rosae | Tinctura rosarum |
| Syrupus rosae gallicae | | | |
| Rosmarinus officinalis cacumina | Rosmarinus | Rosmarini cacumina | |
| Spiritus rosmarini officinalis | Spiritus rosmarini | Spiritus rosmarini | |
| Oleum volatile rosmarini officinalis | Oleum essentiale rosmarini | Oleum rosmarini | |
| Rubiae tinctorum radix | Rubia | Rubiae radix | |
| *Rumex aquaticus* | Rumex aquaticus | | Britannica; Hydolapathum |
| Rumicis acetosae folia | | Acetosae folia | |
| Rutae graveolentis herba | Ruta | | |
| Extractum rutae graveolentis | Extractum rutae | | |
| | Oleum essentiale rutae | | Oleum rutae aethereum |
| | | Confectio rutae | Electuarium e baccis lauri |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Saccharum non purificatum | Saccharum | Saccharum | |
| Saccharum purificatum | | Saccharum purificatum | |
| Syrupus simplex | Syrupus simplex | Syrupus simplex | Syrupus communis |
| Syrupus empyreumaticus | | | Molasses; Treacle |
| Sagapenum; gummi resina | Sagapenum | Sagapenum | Serapinum |
| *Salix alba* | Salix | | |
| *Salix fragilis* | Salix fragilis | | |
| Salix caprea | | Salicis cortex | |
| Salviae officinalis folia | Salvia | | Herba salviae minoris |
| Sambuci nigrae flores | Sambucus | Sambuci flores | |
| Baccae sambuci nigrae | | | |
| Cortex sambuci nigrae | | | |
| | Unguentum sambuci | Sambuci unguentum | |
| Succus spissatus sambuci nigrae | Succus spissatus sambuci | | Rob baccarum sambuci |
| Sapo durus | Sapo durus Hispanicus | Sapo durus | Sapo ex olivæ oleo et soda confectus |
| | | Ceratum saponis | |
| Tinctura saponis camphorata | Linimentum saponis | Linimentum saponis compositum | Balsamum saponaceum |
| Emplastrum saponaceum | Emplastrum saponis | Emplastrum saponis | Emplastrum e sapone |
| Sapo mollis | | Sapo mollis | Sapo ex oleo et potassa confectus |
| Scillae maritimae radix | Scilla | Scillae radix | Squilla |
| Radix scillae maritimae exsiccata | Pulvis scillae | | Scilla praeparata |
| Acetum scillae | Acetum scillae | Acetum scillae | Acetum scilliticum |
| Syrupus scillae | Oxymel scillae | Oxymel scillae | Oxymel scilliticum |
| Tinctura scillae | Tinctura scillae | Tinctura scillae | Essentia squillae |
| Pilulae scilliticae | Pilulae scillae cum zingibere | Pilulae scillae compositae | |
| *Scrophularia nodosa* | Scrophularia | | |
| *Sium nodiflorum* | Sium | | |
| Sinapis albae semina | Sinapi | Sinapis semina | Sinapisnigra |
| | Cataplasma sinapeos | Cataplasma sinapis | Sinapismus |
| Smilacis sarsaparillae radix | Sarsaparilla | Sarsaparillae radix | |
| Decoctum smilacis sarsaparillae | Decoctum sarsaparillae | Decoctum sarsaparillae | |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| | Decoctum sarsaparillae compositum | Decoctum sarsaparillae compositum | |
| | | Extractum sarsaparillae | |
| Sodæ subcarbonas impurus | Barilla, soda impura | Soda impura | Natron impurum |
| Subcarbonas sodae | Carbonas sodae | Sodae subcarbonas | Sal sodæ. Alcali minerale aëratum |
| | Carbonas sodae siccatum | Sodae subcarbonas exsiccata | |
| Carbonas sodae | | Sodae carbonas | |
| Aqua supercarbonatis sodae | | | |
| Phosphas sodae | Phosphas sodae | | |
| Sulphas sodae | Sulphas sodae | Sodae sulphas | Sal catharticus Glauberi |
| Murias sodae | Sal commune ; murias sodae | Sodae murias | Muria ; sal commune |
| | Murias sodae siccatum | | |
| Sub-boras sodae | Borax, sub-boras sodae | Sodae sub-boras | |
| Mel sub-boratis sodae | | Mel boracis | |
| Solani dulcamarae radix | Dulcamara | Dulcamarae caulis | Solanum scandens |
| | | Decoctum dulcamarae | |
| *Solidago virga aurea* | Virga aurea | | |
| Spartii scoparii summitates | Genista | Spartii cacumina | |
| | Extractum genistae | | |
| Spermaceti | Spermaceti | Cetaceum | Physeter macrocephalus |
| Spigeliae Marilandicae radix | Spigelia | Spigeliae radix | |
| | Unguentum spermatis ceti | Unguentum cetacei | Linimentum album |
| Ceratum simplex | | Ceratum cetacei | Ceratum album |
| Spongia officinalis | Spongia | Spongia | |
| | Pulvis spongiae ustae | Spongia usta | |
| Stanni limatura | Stannum | Stannum | |
| Pulvis stanni | Pulvis stanni | | |
| Styracis benzoini Balsamum | Benzoe | Benzoinum | Assa dulcis |
| Tinctura benzoini composita | Tinctura benzoini composita | Tinctura benzoini composita | Balsamum traumaticum |
| Styracis officinalis balsamum | Styrax calamita | Styracis balsamum | |
| | Styrax purificata | | |
| Succinum | Succinum | Succinum | Electrum, Carube |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Oleum succini | Oleum succini | Oleum succini | |
| Oleum succini purissimum | Succini oleum rectificatum | | |
| *Sulphur* | | Sulphur | |
| Sulphur sublimatum | Sulphur sublimatum | Sulphur sublimatum | Flores sulphuris |
| Sulphur sublimatum lotum | Sulphur sublimatum lotum | Sulphur lotum | |
| | | Sulphur praecipitatum | |
| Unguentum sulphuris | Unguentum sulphuris | Unguentum sulphuris | Unguentum antipsoricum |
| | | Unguentum sulphuris compositus | |
| Oleum sulphuratum | | Oleum sulphuratum | Balsamum sulphuris |
| *Swietenia febrifuga ; cortex* | Swietenia febrifuga | | |
| Tamarindi Indicae fructus | Tamarindus | Tamarindi pulpa | |
| Tanaceti vulgaris folia | Tanacetum | | |
| Flores tanaceti vulgaris | | | |
| *Teucrium chamaedrys* | Chamaedrys | | |
| *Teucrium marum* | Marum syriacum | | |
| Toluiferae balsami balsamum | Balsamum Tolutanum | Balsamum Tolutanum | Balsamum de Carthagena |
| Tinctura toluiferae balsami | Tinctura balsami tolutani | | |
| Syrupus toluiferae balsami | | Syrupus Tolutanus | Syrupus balsamicus |
| Tormentillae erectae radix | Tormentilla | Tormentillae radix | Tormentilla officinalis. *Lond.* |
| Tussilaginis farfarae folia | Tussilago | Tussilago | |
| Flores tussilaginis farfarae | | | |
| Valerianae officinalis radix | Valeriana | Valerianae radix | |
| | Tinctura valerianae | Tinctura valerianae | |
| Tinctura valerianae ammoniatae | Tinctura valerianae ammoniata | Tinctura valerianae ammoniata | Tinctura valerianae volat. |
| | Extractum valerianae | | |
| | Infusum valerianae | | |
| Veratri albi radix | Helleborus albus | Veratri radix | |
| | | Decoctum veratri | |
| | | Vinum veratri | |
| | Unguentum hellebori albi | Unguentum veratri | |

| EDINBURGH. | DUBLIN. | LONDON. | VARIOUS. |
|---|---|---|---|
| Tinctura veratri albi | | | |
| *Veronica beccabunga* | Beccabunga | | |
| Vinum album Hispanum | | Vinum (Sherry) | |
| Violae odoratae flores | Viola | | Viola martialis |
| Syrupus violae odoratae | Syrupus violae | | |
| Vitis viniferae fructus | Uvae passae sole siccatae | Uvae passae | |
| Ulmi campestris cortex | Ulmus | Ulmi cortex | |
| | Decoctum ulmi | Decoctum ulmi | |
| Winterae aromaticae cortex | | | Winteranus cortex |
| Zincum | Zincum | Zincum | |
| Carbonas zinci impurus | Calaminaris | Calaminaris | Cadmia fossilis |
| Carbonas zinci impurus praepar. | Lapis calaminaris praeparatus | Calamina praeparata | |
| Ceratum carbonas zinci impuri | Unguentum calaminaris | Ceratum calaminae | Ceratum epuloticum |
| Oxidum zinci | Oxydum zinci | Zinci oxydum | Flores zinci |
| Unguentum oxidi zinci | Unguentum oxidi zinci | Unguentum zinci | |
| Oxidum zinci impurum | Tutia | | |
| Oxidum zinci impurum praeparatum | | | |
| Unguentum oxidi zinci impuri | Unguentum tutiae | | |
| Solutio acetatis zinci | Tinctura acetatis zinci | | |
| Sulphas zinci | Sulphas zinci | Zinci sulphas | Sal vitrioli; Calcanthum album |
| Solutio sulphatis zinci | | | Aqua vitriolica |

NOTE.—The articles in Italics in the first column are the scientific names of articles not in the Edinburgh Pharmacopœia.

# ENGLISH INDEX.

D

## N

# LATIN INDEX.

D

N



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## P

THE END.

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